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DISEASES CAUSED BY BACTERIA AND FUNGI

Wilson, C. D. & Davidson, I. (1961). **The control of staphylococcal mastitis.** — Vet. Rec. **73,** 321-323. **2796**

Control measures recommended include antibiotic treatment of mastitis cases, care of the milking machine to ensure its optimum efficiency, disinfection of teat-cup cluster and milk tubes after each cow is milked, the use of an antibacterial agent in the udder-washing water and one cloth per cow, minimum handling of the udders and the milking of infected cows last.—E.V.L.

Zinn, R. D., Anderson, G. R. & Skaggs, J. W. (1961). **The public health significance of staphylococcic infection in cattle.**—J. Amer. vet. med. Ass. **138,** 382-386. [Authors' summary modified.] **2797**

There is not a clearly defined demarcation between human and animal strains of *Staphylococcus aureus*, even though these terms are frequently used. Epidemiological evidence indicates that staphylococci are not always species-specific. The impact of human strains associated with hospital epidemics upon the animal population has not been fully measured. A human "epidemic" strain of *Staph. aureus* has produced persistent furunculosis in a dairy herd attended by persons harbouring such staphylococci in their nostrils. Cattle might serve as hosts for antibiotic-resistant staphylococci which are a major problem in hospitals.

Derbyshire, J. B. (1961). **The immunization of goats against staphylococcal mastitis by means of experimental infections of the skin and udder.** — Res. vet. Sci. **2,** 112-116. [Author's summary modified.] **2798**

When subcutaneous abscesses were produced in goats by living staphylococci of strain BB, the goats were immune to a massive intramammary test dose with the same strain. The inoculation of increasing doses of strain BB into one half of the udder of a further group of goats increased the resistance of this half, but not of the other half, of the gland to a massive dose of the same strain.

Derbyshire, J. B. (1961). **Further immunological studies in experimental staphylococcal mastitis.** — J. comp. Path. **71,** 146-158. [Author's conclusions modified.] **2799**

Vaccination of goats with strain 201 adjuvant cell-toxoid conferred a high level of immunity against mammary challenge with strains 201 and 106, but not against strains BB, N_{90} and $S_{20}T$, although the production of gangrene by these strains appeared to be prevented. Immunity to mammary challenge by a particular strain was correlated with the power of the serum of the goat to protect mice against the same strain.

Vaccination of goats with strain BB adjuvant cell-toxoid failed to confer a high level of immunity against challenge with the homologous strain.

The antibody response of goats in severe experimental mastitis produced by strain BB resembled that in severe mastitis produced by strain 201, but sera from goats experimentally infected with strain BB failed to protect mice against this strain, but did protect against strain 201.

Nakagawa, M. (1960). **Studies on bacteriophage typing of staphylococci isolated from bovine milk. III. Typing by means of a new phage set.**—Jap. J. vet. Res. **8,** 331-342. [In English.] **2800**

Of 77 staphylococcal phages isolated, 16 were selected for typing staphylococcal strains from milk. These specific Japanese phages, divided into groups A, A_2 and B, were considered to be more suitable for typing staphylococci isolated from cows' milk in

Japan, than those internationally available.
—E.G.

Dineen, P. (1961). **A period of unusual microbial susceptibility in an experimental staphylococcal infection.** — J. infect. Dis. **108,** 174-180. [Author's summary modified.] **2801**

In experimental staphylococcal infections in mice the time and dosage of therapy were varied independently. One dose of 4 mg. of streptomycin 1 hour after challenge was as effective as daily therapy. If the streptomycin injection was before, simultaneous with, or more than 1 hour after challenge, the efficacy was greatly reduced. There may be a critical point in any infection at which the infecting organisms are usually vulnerable.

Thomas, M. (1961). **The sticky film method of detecting skin staphylococci.**—Mon. Bull. Minist. Hlth Lab. Serv. **20,** 37-40. [Author's summary.] **2802**

A method making use of sticky tape is described for demonstrating the presence of staphylococci and other organisms on different areas of the human body. By its means the bacterial flora of the skin can be mapped out, not only qualitatively but to some extent quantitatively. The pieces of tape are easy to use, and are much lighter than tubes and swabs for transmission by post.

Finegold, S. M. & Sweeney, E. E. (1961). **New selective and differential medium for coagulase-positive staphylococci allowing rapid growth and strain differentiation.** — J. Bact. **81,** 636-641. [Authors' summary modified.] **2803**

The medium described allows rapid growth and strain differentiation and has other advantages. The degree of selectivity is such that growth of colonies morphologically resembling staphylococci on this polymyxin staphylococcus medium serves as excellent presumptive evidence of coagulase-positive staphylococci (*Staph. aureus*). It should be useful in the clinical laboratory (both as a primary isolation medium and as a secondary medium), in carrier surveys, in studies of the hospital environment, and in research.

Hale, H. H., Plastridge, W. N. & Stula, E. F. (1961). **Streptococcus agalactiae reinfection and eradication in a commercial herd.** — Cornell Vet. **51,** 200-204. [Authors' summary modified.] **2804**

Observations on a commercial dairy herd that was re-infected with *Str. agalactiae* 11 years after this organism was eradicated show that (1) periodic tests are needed to detect new infection, (2) additions purchased as pregnant heifers may be a source of re-infection, and (3), with the exception of one *Str. agalactiae*-treated quarter that returned positive after 3 monthly negative tests, *Str. agalactiae* was eliminated within 3 months by frequent laboratory testing, treatment, and sanitation.

Sanitary measures for preventing spread of *Str. agalactiae* infection were (1) use of a separate towel removed from a pail of disinfectant solution for cleaning teats before milking, (2) rinsing teat cups in a pail of running water between cows, and (3) dipping teat ends in an antiseptic solution after each milking.

Davis, J. W. (1961). **Studies on swine dysentery. I. Biochemical and cultural comparison of vibrio of swine and of other origins. II. Swine dysentery transmission. III. Therapeusis of swine dysentery.**—J. Amer. vet. med. Ass. **138,** 471-473, 473-477 & 477-483. [Author's summaries modified.] **2805**

I. Biochemical and growth characteristics of 18 cultures of vibrios from pigs, 4 from man, and 1 from sheep were compared. Only one of the cultures from pigs appeared to be pathogenic for pigs.

All porcine, human, and ovine strains produced catalase and reduced nitrates. None produced indol, affected litmus milk, or liquefied gelatin. All grew at 29° and 37°C.; none at 16° and 45°C. All grew in media adjusted from pH 5·8 to 8·2; one culture grew in a pH range of 5·2 to 8·9.

Only cultures from pigs produced hydrogen sulphide.

II. Five of 6 attempts, involving 23 pigs, to transmit swine dysentery by exposure of susceptible pigs to pure cultures of vibrio isolated from diseased pigs were unsuccessful. In the 6th attempt, a diarrhoeal disease, not typical of dysentery, was produced when the pigs were simultaneously exposed *per os* to infectious colon filtrate and vibrio culture.

For the most part, swine dysentery was not induced *per os* or by intracolonic exposure of pigs to infectious colon filtrate.

Faeces from pigs with swine dysentery were infectious as early as 5 days after exposure. The immunity of 11 pigs was challenged with ground, infected colon, and all contracted clinical swine dysentery.

III. The efficacy of furazolidone, sodium salt of 1-(5-nitro-2-furaldehyde)-4-*p* arsenophenyl semicarbazone (Nf 256), and sodium

arsanilate was compared in 3 herds naturally infected with swine dysentery: there was no definitive evidence that nitrofurans were more effective than sodium arsanilate in treatment. The same was true in similar trials with artificially infected pigs, but in some of the trials, rate of gain in pigs treated with nitrofurans was slightly better.

Klein, F., Mahlandt, B. G., Lincoln, R. E., DeArmon, I. A., Jr. & Fernelius, A. L. (1961). **Immunization as a factor affecting the course of septicemic anthrax.** — Science **133,** 1021-1022. [Authors' summary modified.] **2806**

Immunization of g.pigs with alum-precipitated antigen increased resistance approximately 1,600 times. The growth rate of *Bacillus anthracis,* in the septicaemic phase, was the same in both normal and immunized animals; but the number of bacilli per ml. of blood at death was decreased by 75% in immunized animals. Neither the enhancement of virulence by treatment with egg yolk nor the size of the challenge dose affected the growth rate or the number of bacilli per ml. of blood at death. Mean time to death for the treatments tested varied from about 20 to 100 hours. In non-immunized animals challenged with a strain of low virulence the terminal number of bacilli per ml. of blood and the growth rate in the blood were the same as for the highly virulent strain.

Taylor, M. J., Rooney, J. R. & Blundell, G. P. (1961). **Experimental anthrax in the rat. II. The relative lack of natural resistance in germ-free (Lobund) hosts.**—Amer. J. Path. **38,** 625-638. [Authors' summary modified.] **2807**

Rats reared germ-free were tested at the age of 5 weeks for susceptibility to intradermally injected spores of *Bacillus anthracis.* The LD_{100} for these rats was less than 100 spores, which is 1/10,000,000th the LD_{50} for 31-day-old and 1/100th the LD_{50} for 6-day-old conventionally reared rats. This places the level of the 5-week-old germ-free rat's resistance at least as low as that of conventional rats less than 1 week old. The presence of antibody to *B. anthracis* protective antigen in serum of 2 rats alive on the 16th day after challenge revealed that these rats were capable of forming antibody in response to antigenic stimulation. Gamma globulin levels, determined electrophoretically, were equally low in serum of 5-week-old germ-free and conventional rats compared with the higher level found in 4- and 11-month-old conventional rats. This means that the development of high resistance to *B. anthracis* in the conventional rat precedes the detected rise in serum gamma globulins. Histological studies suggested that death may result from different causes in the germ-free and in the conventional rat.

Dowdle, W. R. & Hansen, P. A. (1961). **A phage-fluorescent antiphage staining system for Bacillus anthracis.**—J. infect. Dis. **108,** 125-135. [Authors' summary modified.] **2808**

An indirect (phage-fluorescent antiphage) staining system for *B. anthracis* has been proposed and the immunologic specificity demonstrated. Phage-fluorescent antiphage-positive bacilli were readily identified by the characteristic appearance of the staining reaction, the particulate fluorescence being completely dissimilar to the usually uniform primary or secondary (fluorescent antibody) fluorescence.

All 29 strains examined gave positive phage-fluorescent antiphage reactions.

Phage staining was more specific than conventional fluorescent antibody staining. Of 91 saprophytic *Bacillus* strains, 9 reacted with the phage-fluorescent antiphage system, whereas 43 were stained with fluorescent antibodies against the somatic antigens of *B. anthracis* and the spores from 42 were stained with fluorescent antibodies against the spore antigens of *B. anthracis.* The 9 phage-fluorescent antiphage-positive non-anthrax strains consisted of 5 non-rhizoid variants of *B. cereus* var. *mycoides* and 4 strains of *B. cereus.*

Highly capsulated *B. anthracis* grown on bicarbonate medium under CO_2 did not stain with the phage system.

Vardaman, T. H. & Larsen, A. B. (1961). **Bovine tuberculosis—studies of complement-fixation antigens.** — Amer. J. vet. Res. **22,** 204-208. [Authors' summary modified.] **2809**

In a study of the c.f. test for bovine TB., 114 antigens were prepared from various combinations of bovine tissues, tubercle bacilli, and their metabolic products. The antigens were screened by testing with serum from: (1) cattle naturally infected with bovine TB.; (2) cattle sensitized with heat-killed BCG; and (3) normal cattle.

The best antigen was in the supernatant fluid from a mixture of normal dried bovine intestinal mucosa and human type tubercle bacilli which had been exposed to ultrasonic

vibrations. The mixture was refluxed, adjusted for pH, and centrifuged. An antigen of nearly equal activity was prepared in the same manner for bovine type tubercle bacilli.

Vandiviere, H. M., Vandiviere, M. R. & Seibert, F. B. (1961). **Comparison between purified individual tuberculo-proteins and the international standard tuberculin.**—J. infect. Dis. **108,** 45-52. [Authors' summary modified.] **2810**

A new method of measuring tuberculin reactions is described. It appears to be more sensitive for quantitative assessment and permits a more critical and valid evaluation of comparisons.

Three proteins from unheated tuberculin filtrates and one from bacillary bodies (designated A, B, C and bacillary protein) were compared with PPD-S as skin test antigens in tuberculous patients and in people vaccinated with a human strain vaccine (R_1Rv) or a bovine strain vaccine (BCG), as well as in non-tuberculous but naturally sensitized individuals.

The C fraction proved considerably less sensitive and possibly less specific than the standard PPD-S in all subjects, indicating that its presence in PPD may dilute the strength.

The B protein appeared to be more sensitive and possibly more specific as a skin test antigen than PPD-S.

Turk, J. L. (1961). **Active sensitization to tuberculin with cells from tuberculin-sensitized guinea pigs.** — Nature, Lond. **189,** 889-890. **2811**

After passive transfer to non-sensitized animals, of live cells from g.pigs hypersensitive to tuberculin, the recipient may show skin hypersensitivity to tuberculin for 3 months or more. The author's experiments on g.pigs indicated that a transient delayed hypersensitivity is transferred by intact peripheral blood leucocytes, spleen cells and lymph node cells, and that it may be followed by a superimposed active immunization persisting far beyond the time when the donor cells would have been destroyed.—E.V.L.

Hübner, K. & Kienholz, M. (1961). Über den Einfluss der temporären Ischämie und Hypoxämie auf die Tuberkulinreaktionen bei Meerschweinchen. **[Influence of temporary ischaemia and hypoxaemia on the tuberculin reaction in g. pigs.]** — Virchows Arch. **334,** 1-11. [Summary in English.] **2812**

Temporary ischaemia before the injection of tuberculin reduced or prevented skin reaction in tuberculous g.pigs. Induction of ischaemia in infected g.pigs three hours after injection of tuberculin intensified the reaction, even to the extent of anaphylactic shock. Lethal tuberculin shock could be prevented or at least delayed by exposure to hypoxia in a low-pressure chamber.—E.G.

Freerksen, E. & Lauterbach, D. (1961). Zur Bedeutung und Differenzierung von sog. "unspezifischen" Tuberkulinreaktionen. **[Significance and differentiation of non-specific tuberculin reactions.]**—Zbl. VetMed. **8,** 158-174. [Summaries in English, French and Spanish.] **2813**

Ingestion by calves of avirulent mycobacteria (*M. phlei, M. fortuitum, M. smegmatis,* etc.), suspended in milk, produced temporary positive tuberculin reactions with mammalian tuberculin which ceased after administration of mycobacteria was discontinued. Differentiation from bovine type infection was by the conventional simultaneous mammalian-avian type tuberculin test. In comparative simultaneous tests with mammalian and avian tuberculins and tuberculin prepared from other mycobacteria, reaction to homologous strains was strongest and persisted longest.—E.G.

Takahashi, Y., Fujita, S. & Sasaki, A. (1961). **The specificity of the passive hemagglutination methods used in serology of tuberculosis.** — J. exp. Med. **113,** 1141-1154. [Authors' summary modified.] **2814**

The Middlebrook-Dubos haemagglutination test with normal red cells and the Boyden haemagglutination test with tanned red cells were strictly specific, for tubercle polysaccharide and for the protein antigens. The former test detects polysaccharide and the latter protein antibodies. Evidence is given that polysaccharide does not adhere to the surface of tanned red cells nor protein to the normal red cell surface. Haemosensitizing ability and *in vitro* antigenicity were distinct properties of tubercle polysaccharide and protein antigens.

The phosphatide haemagglutination test with normal red cells sensitized with tubercle phosphatide is also specific; it detects only phosphatide antibodies.

The three different kinds of antibodies, antipolysaccharide, antiprotein, and antiphosphatide, were shown to be completely distinct

from each other in tuberculous serum. Each of them can be completely removed from serum by absorption with red cells or kaolin particles coated with its corresponding antigen.

Reliability of the cross-inhibition test is discussed.

Pallaske, G. (1960). Zur Frage der Gehirntuberkulose des Huhnes. **[Cerebral tuberculosis in fowls.]**—Arch. exp. VetMed. **14,** 1102-1110. **2815**

Lesions, closely resembling those of TB., present in 2 of 100 brains from fowls with generalized TB., were described in detail and illustrated by photomicrographs. Contrary to the findings by Mauz (1953), who isolated tubercle bacilli from 37 of 50 apparently normal brains of fowls with generalized TB., tubercle bacilli were not demonstrable in Ziehl-Neelsen stained brain sections.—E.G.

I. Shchurevskii, V. E. (1961). **[Pathological confirmation of serological and allergic tests for paratuberculosis in cattle.]**—Veterinariya, Moscow No. 2 pp. 23-25. **2816**

II. Gazarkh, Z. S. & Sharov, V. A. (1961). **[Complement fixation test for paratuberculosis.]**—Ibid. pp. 25-28. [In Russian.] **2817**

I. Two infected herds, numbering 5,000 cattle, were investigated by the c.f. test using VIEV antigen and by the i/d test using avian tuberculin. 157 reactors were isolated and tests on them were repeated at intervals of 6–8 weeks; 63 were examined after slaughter. It was concluded that the c.f. test detected 3 or 4 times as many active bacillary excretors as the i/d test, but both tests should be employed to detect all infected animals.

II. VIEV antigen is prepared from 45-day cultures of *M. johnei* suspended in 0·5% phenolized saline and autoclaved at 115°C. It was compared with avian tuberculin in tests on 6,000 cattle and 960 sheep and goats. 4% of 240 reacting cattle and 67% of 57 reacting sheep or goats reacted to the c.f. test alone; 40% and 16% (respectively) reacted to the i/d test alone and the remainder reacted to both tests. Positive c.f. tests were confirmed after slaughter in 82% of cattle and 80% of sheep or goats.—R.M.

Payne, J. M. & Rankin, J. D. (1961). **I. The pathogenesis of experimental Johne's disease in calves. II. A comparison of the pathogenesis of experimental Johne's disease in calves and cows.**—Res. vet. Sci. **2,** 167-174 & 175-179. **2818**

I. Calves were infected with an oral dose of 200 mg. *M. johnei* moist culture. The infection entered through the tonsil and the intestinal mucosa, and then became localized in the mucosa of the small intestine, the associated lymph nodes and to a lesser extent in the tonsil and suprapharyngeal lymph nodes. At a later stage, masses of epithelioid cells accumulated in the mucosa of the small intestine and led to clinical disease by progressive build-up of infection and extension of lesions.

II. The pathogenesis of the disease was compared in calves and cows killed at intervals of 2, 3, 4 and 6 months after oral infection. Lesions were more widespread and severe at an earlier stage in the cows than in the calves, but 3 months after infection lesions were common in the calf but had become rare and difficult to find in the cow. The reason for the quick but transient reaction of the adult animal may involve any of the following factors:— (1) calf tissue cells may not be sufficiently mature to react as vigorously as in the cow; (2) immune reactions may be slower to develop and weaker in calves than in cows; (3) in the course of normal life cows are exposed to various non-specific infections, some of which may sensitize to *M. johnei.*

—E.V.L.

Rajya, B. S. & Singh, C. M. (1961). **Studies on the pathology of Johne's disease in sheep. III. Pathologic changes in sheep with naturally occurring infections.** — Amer. J. vet. Res. **22,** 189-203. [Authors' summary modified.] **2819**

Nineteen sheep naturally affected with Johne's disease were studied. They gave positive reactions to avian tuberculin and johnin. Clinically the animals were classified as extremely emaciated, slightly weak, and apparently healthy.

The pathological changes in sheep of the 3 groups varied with regard to involvement of the intestines and lymph nodes, the types of reacting cells, intensity of reaction, effects of reaction, and the presence of acid-fast organisms in smears and tissue sections.

Chandler, R. L. (1961). **Infection of laboratory animals with Mycobacterium johnei. I. Infection in Swiss white mice and its modification by suramin and cortisone. II. Infection in white rats; effect of cortisone treatment. III. Liver and spleen infections in vaccinated and unvaccinated Swiss white mice.** — J. comp.

Path. **71**, 118-130; 131-134 & 135-139. [Author's conclusions modified.] **2820**

I. Swiss white mice were inoculated i/p with *M. johnei* and the infection studied over one year. The disease produced was compared with that in groups of mice treated with suramin or with cortisone.

The intensity of infection in the liver and spleen was studied in smears and sections. Liver and spleen infections occurred in all the mice but the intensity varied.

Intestinal infection, simulating classical Johne's disease, was detected in only a few mice. Suramin enhanced the liver and spleen infections and, to a limited degree, the intestinal infections.

Cortisone reduced the liver and spleen infections, and had no effect on intestinal infection.

Swiss white mice appeared to be of limited value as experimental animals for the study of Johne's disease. But the constancy of the liver and spleen infections, their comparatively early occurrence, and ease of assessment suggested that they may be of use in screening trials of therapeutic and prophylactic agents.

II. Recently weaned white Wistar rats were infected with *M. johnei* and observed over one year; one group was treated with cortisone at the commencement of the experiment. No intestinal infections were detected. Infection of the liver and spleen occurred, but was not marked. Viable bacilli could be recovered from some of the rats one year after infection, but there was evidence of resolution of the infection at this time. Cortisone treatment did not enhance the infection and may have reduced it. It was concluded that rats are unlikely to be of use in laboratory studies of Johne's disease.

III. Swiss white mice were vaccinated and challenged with *M. johnei*. The intensity of infection in the liver and spleen was studied in smears and sections. A degree of protection could be detected when a challenge dose of 2 mg. *M. johnei* was used, and the mice were examined four months later but a decisive and easily interpreted result was not obtained. It is considered that Swiss white mice could not be used as a screening test for vaccines against Johne's disease.

Brill, J. & Polityńska, E. (1961). Die Differenzierung von Erysipelothrix rhusiopathiae-Stämmen mit Bakteriophagen. **[Phage typing of E. rhusiopathiae.]**—Zbl. Bakt. I. (Orig.) **181**, 473-477. [Summaries in English, French, Spanish and Russian.] **2821**

Two serotype A-specific *E. rhusiopathiae* bacteriophages, F1 and F2, were isolated and described. Over a period of four years their lytic properties remained constant.—E.G.

Potel, K. (1960). Gehirnbefunde bei Meerschweinchen nach experimenteller Infektion mit Listeria monocytogenes unter besonderer Berücksichtigung der Neuropathogenese. **[Brain lesions in guinea-pigs infected with L. monocytogenes.]** — Arch. exp. VetMed. **14**, 1129-1148. **2822**

Intracerebral infection of 89 g.pigs with *L. monocytogenes* produced highly inflammatory and degenerative processes in the brain, which soon became generalized. P.M. findings included purulent meningitis, severe lesions in the ventricles, the chorioid plexus and the parenchyma. Groups of 10–20 g.pigs were infected i/v, s/c, i/m, i/p, by nasal instillation or orally. Nearly all died, but, only a proportion of those infected i/m, i/v, intranasally and orally developed encephalitis, confined to the cerebral regions adjoining the ventricles, the cerebellar medulla and the cord. It was suggested that distribution of listeria was also *via* the nervous pathways in addition to the circulatory route. —E.G.

Golat, T. (1961). Dwa przypadki pasterelozy u koni. **[Pasteurella infection in two horses.]** — Med. Wet., Warszawa **17**, 25-26. [In Polish.] **2823**

An account of two isolated cases in a filly aged 10 months and a mare 8 years old. The filly died overnight after showing anorexia, dyspnoea and submandibular swelling. The mare stopped eating, had dyspnoea and pyrexia (up to 40·2°C.) and died after 3 days. In both cases P.M. examination revealed severe pulmonary congestion and hydropericardium.—M. Gitter.

Amitrov, V. K., Nechaev, S. P., Medvedev, N. A. & Kazakov, M. Y. (1961). **[Pasteurellosis in cattle: infection of calves from milk.]** — Veterinariya, Moscow No. 3 pp. 30-32. [In Russian.] **2824**

Within a week of the death of a cow from haemorrhagic septicaemia, 18 calves on the same farm died, 82 were emergency slaughtered, and 35 were affected but recovered. All had received whole milk; older calves given milk substitute were not affected. The calves developed fever,

dyspnoea and muscular tremors, sometimes oedema of the head and neck. Pasteurella was isolated. Treatment with pasteurella hyperimmune serum and penicillin gave poor results.—R.M.

Gale, C., King, N. B. & Sanger, V. L. (1961). **Attempt at transmission of shipping fever.**—Cornell Vet. **51,** 219-234. [Authors' summary modified.] **2825**

Of 35 dairy calves exposed to material from animals with shipping fever, 17 developed a temperature response, and in 10 of these there were no other signs. The other 7 exhibited various respiratory signs. The febrile response occurred in animals exposed to material from which no bacteria were recovered. In one instance material that contained both PPLO and pasteurella organisms failed to reproduce the febrile response. The gross and microscopic pathology from one natural case of shipping fever and two experimentally produced respiratory infections were similar, except that lesions were more extensive in the natural case. Bronchiolitis and peribronchiolitis with neutrophilic response were the primary lesions. There was oedema of the interlobular septa.

Gardiner, M. R. & Craig, J. (1961). **Generalised Pseudomonas infection in a cow.**—Vet. Rec. **73,** 372-373. [Authors' summary modified.] **2826**

A systemic infection arising from pseudomonas mastitis in a cow is described. Clinically the syndrome simulated severe Johne's disease, whilst the main pathological features were chronic pyelonephritis and renal plasmacytosis; adrenal cortical hypertrophy, nodulation and plasmacytosis; fibrinous pleuritis and fibrinous pericarditis; and chronic mastitis. There was marked hypergammaglobulinaemia.

Löliger, H. C. (1961). Die Pathologie der nekrotisierenden Entero-Colitis der Chinchilla nach Infektionen mit Pseudomonas aeruginosa. **[Pathology of necrotic entero-colitis in chinchillas following infection with Pseudomonas pyocyanea.]**—Kleintier-Praxis **6,** 41-48. [Summaries in English and French.] **2827**

Pseudomonas pyocyanea infection in chinchillas was characterized by focal necrotic entero-colitis and miliary necrosis in parenchymatous organs. Gross lesions resembled those of *Proteus* and *E. coli* infection but histologically in pseudomonas infection there was intravascular agglomeration of bacteria, leading to focal infarcts.

—E.G.

Liu, P. V. (1961). **Identification of pathogenic pseudomonads by extracellular antigens.**—J. Bact. **81,** 28-35. [Author's summary modified.] **2828**

All pathogenic species of pseudomonads, including *Pseudomonas aeruginosa, Ps. pseudomallei, Ps. caviae,* and *Ps. reptilivora,* produce extracellular toxic substances which are antigenic and species-specific. Antisera produced with these substances can be used to identify strains.

Extensive cross reactions occurred between the extracellular antigens of *Ps. aureofaciens, Ps. chlororaphis,* and many strains of the haemolytic, lecithinase positive *Ps. fluorescens,* indicating their close relationships.

Henson, J. B. & Grumbles, L. C. (1961). **Infectious bovine keratoconjunctivitis. III. Demonstration of toxins in Moraxella (Hemophilus) bovis cultures.**—Cornell Vet. **51,** 267-284. [Authors' summary modified.] **2829**

Cultures of *Haemophilus bovis* grown on chick embryos and on agar were inactivated and injected into mice and chick embryos. Little change was produced in the injected animals.

A labile, haemolytic toxin was demonstrated in *H. bovis* cultures. Inactivation of the cultures by various methods caused a loss of the toxin which was inseparable from the viable cell by the methods used.

A dermonecrotic toxin was demonstrated in the cell wall of *H. bovis*: it was thermostable and resembled many of the Gram-negative toxins.

Viable and non-viable cultures of *H. bovis* injected intracorneally in rabbits and calves produced symptoms and lesions closely resembling those seen in clinical infectious bovine keratoconjunctivitis.

Cooper, B. S. (1961). **Treatment of conjunctivo-keratitis of sheep and cattle with ethidium bromide. II. Contagious conjunctivo-keratitis of sheep (C.C.K.).**—Vet. Rec. **73,** 409-415. [Author's summary modified.] **2830**

Ethidium bromide (0·5%) eye ointment was used in experimental infections, an experimentally produced outbreak and 10 farm outbreaks. There was marked response to treatment within 48 hours and a similar result followed the use of chlortetracycline or formulated oxytetracycline. Treatment with

chloramphenicol, dihydrostreptomycin or penicillin was ineffective. Relapses were common in treated and untreated eyes but were usually less severe than the primary infection. Treatment is indicated for the prevention of blindness or serious eye damage and does not prejudice the development of natural immunity.

Rauch, H. C. & Pickett, M. J. (1961). **Bordetella bronchiseptica bacteriophage.** — Canad. J. Microbiol. **7**, 125-133. [Authors' abst. modified.] **2831**

Thirty-eight phages were isolated from 48 strains of *Bordetella bronchiseptica* [*Haemophilus bronchisepticus*] and 3 additional phages were obtained as spontaneous, virulent mutants of these isolates. Nine strains of *Bordetella* [*Haemophilus*] *parapertussis* were tested and each was sensitive to at least 2 of these phages; this heterologous lysis of *parapertussis* was obtained with 18 of the *B. bronchiseptica* phages, and represents additional evidence for the taxonomic relationship of these two species. However, no similar relationship was demonstrable with *Bordetella* [*Haemophilus*] *pertussis;* 50 strains were all insensitive to these phages. Seven strains of *Alcaligenes faecalis* and several of *Brucella* species were equally insensitive.

MacDonald, D. W. & Oakley, G. A. (1961). **The prophylactic use of blood in colibacillosis of calves.**—Vet. Rec. **73**, 415-416. **2832**

Of 23 successive cases of colibacillosis in calves on a farm, 21 showed no response to sulphadimidine, sulphapyridine, streptomycin or oxytetracycline. Proprietary white scour serum had no preventive effect. The next 19 calves born were inoculated s/c within 12 hours of birth with 50 ml. of citrated blood from the cows. Only 3 became ill and one of these recovered spontaneously. Later cases that developed despite the injection of whole blood responded quickly to oxytetracycline. —M.G.G.

Richards, W. P. C. & Fraser, C. M. (1961). **Coliform enteritis of weaned pigs. A description of the disease and its association with hemolytic Escherichia coli.**—Cornell Vet. **51**, 245-257. [Authors' summary modified.] **2833**

The authors described the clinical and pathological features of a specific syndrome in weaning pigs characterized by acute enteritis. Cultures from the intestinal tract consistently yielded large numbers of haemolytic *E. coli,* serologically identical to strains of *E. coli* which cause oedema disease. The pathogenesis is discussed, and reasons are given for considering the organisms isolated to be aetiologically significant.

D'Souza, B. A., Raghavan, N. & Menon, U. K. (1961). **Colibacillosis in dogs.**—Indian vet. J. **38**, 1-7. **2834**

Escherichia coli, recovered from the faeces and urine, was suspected as the cause of a relapsing type of fever in 2 Alsatian dogs. It was not typed serologically, but its appearance in the urine was correlated with the clinical relapses.—R. N. Mohan.

Gupta, B. R. & Rao, S. B. V. (1961). **Enteritis of ducklings caused by an organism belonging to (Shigella) Alkalescens—Dispar group.** — Indian vet. J. **38**, 8-10. **2835**

The authors described the characters of the organism associated with mortality in ducklings aged 2 to 5 weeks and briefly recorded the clinical signs and P.M. features. —R. N. Mohan.

Janssen, G. J. G. M. & van Lipzig, J. H. H. (1961). Behandeling met furazolidone van een koppel veulens met Salmonella typhi murium-infektie. **[Furazolidone treatment of S. typhi-murium infection in foals.]** — Tijdschr. Diergeneesk. **86**, 178-183. [In Dutch. Summaries in English, French and German.] **2836**

Unthriftiness in a batch of 22 young horses aged 18 months was investigated. *S. typhi-murium* was isolated from the faeces in 19 of 22. It was not isolated from blood, but agglutination tests on blood were positive to O and H antigens in 4 cases and to H antigen alone in 6. Furazolidone by mouth at 15 mg./kg. body wt. was given on 4 successive days, and repeated at 25 mg./kg., three and five weeks later. After the third treatment, the organism was isolated from the faeces of only 3 of 21 foals.—R.M.

Anderson, E. S., Galbraith, N. S. & Taylor, C. E. D. (1961). **An outbreak of human infection due to Salmonella typhimurium phage-type 20a associated with infection in calves.** — Lancet, April 22nd, 854-858. [Authors' summary modified.] **2837**

Between July and October 1958, 55 food-poisoning incidents, comprising 90 cases due to *Salmonella typhi-murium* phage-type 20a, were reported in South-East England. There was one death. The same organism was isolated from an outbreak of enteritis in

calves and the evidence strongly suggested calf meat as the vehicle of infection in at least three-fifths of the incidents. At the abattoirs concerned up to 12·7% of rectal swabs of apparently healthy calves yielded phage-type 20a, and the same organism was isolated from 9·5% of calves' palates from one butcher's shop.

The original source of infection of the calves was not found, but cross-infection at a collecting centre probably explains the high isolation-rate in the abattoir.

Chwojnowski, A. (1961). Obserwacje nad działaniem szczepionki "Polityphovac" u lisów niebieskich (piesaków). [**A salmonella vaccine for foxes.**]—Med. Wet., Warszawa **17,** 17-22. [In Polish.] **2838**

C. claimed good results with a polyvalent vaccine made from formolized cultures of salmonella of groups B, C and D. The vaccine can be used prophylactically and therapeutically provided the animals have been well nourished. The vaccination should be repeated after 3 months or at least carried out in all animals in summer and in breeding stock before oestrus.—M. Gitter.

Connor, D. G. & Kass, E. H. (1961). **Effect of artificial fever in increasing susceptibility to bacterial endotoxin.**—Nature, Lond. **190,** 453-454. **2839**

Mice were given graded doses of *S. typhi* endotoxin i/p, some being placed in an incubator at 37°C. before injection and some after injection; body temperatures were recorded. The findings indicated that: (a) elevation of environmental temp. increased susceptibility to the lethal action of endotoxin; (b) careful control of body temp. in experiments employing lethal doses of endotoxin is essential; (c) mice may develop fever when given endotoxin if their body temperatures have initially been elevated; (d) an increased susceptibility to endotoxin and sudden death seem to be related to the increased body temp. of the host animal.—E.V.L.

van Dorssen, C. A. (1961). Een S. pullorum stam, die in het systeem van Lucas c.s. niet is te plaatsen. [**A strain of S. pullorum unclassifiable by the method of Lucas and colleagues.**]—Tijdschr. Diergeneesk. **86,** 491-494. [In Dutch. Summaries in English, French and German.] **2840**

An old laboratory strain had the biochemical properties of "biotype 5" in the classification proposed by F. Ishii and colleagues [*V.B.* **29,** 2361] and the type "intermedius A" of Hinshaw [*V.B.* **12,** page 202]. It did not fit into the classification of French strains given by Lucas and colleagues [*Rec. Méd. vét.* **127,** 547 (1951)].—R.M.

Klatt, C-H. (1961). Om salmonellaundersökningar hos fjäderfä i Helsingfors. [**Examination of fowls, turkeys and geese for salmonella in Helsinki, with special reference to S. montevideo.**] — Finsk VetTidskr. **67,** 283-285. [In Swedish. Summary in German.] **2841**

An anal swab was taken from each of 63 turkeys, 10 fowls and 5 geese, and 233 samples of organs were obtained from 96 fowls. *S. typhi-murium* was isolated from an anal swab from a goose, and *S. montevideo* from 72 organ samples from 48 fowls.

—M.G.G.

Dixon, J. M. S. & Pooley, F. E. (1961). **Salmonellae in a poultry-processing plant.**— Mon. Bull. Minist. Hlth Lab. Serv. **20,** 30-33. [Authors' summary modified.] **2842**

Salmonella organisms were isolated from 75 (13·8%) of 544 specimens taken at a factory that was processing and packing 12,000 broiler chickens daily. Eight different serotypes were found. Salmonella was found on only 13 of 23 weekly visits to the factory, but on these occasions it was isolated without difficulty from eviscerated carcasses and from water tanks in which carcasses were cooled. There is opportunity for the contamination of large numbers of birds in such a plant; 9·9% of the eviscerated carcasses and edible viscera examined harboured salmonella. Dissemination of salmonella probably occurred during the evisceration process and also during the chilling of carcasses in water tanks.

Magwood, S. E. & Annau, E. (1961). **The adsorption of somatic antigens of Salmonella by polystyrene latex particles.** — Canad. J. comp. Med. **25,** 69-73. [Authors' abst. modified.] **2843**

A latex agglutination test for the detection of salmonella antibodies in turkey sera is described. Crude and partially purified extracts containing salmonella somatic antigens were adsorbed by polystyrene latex particles (diam. 0·557 and 1·171 μ). The particles acquired serological specificity and were agglutinated by homologous antibodies.

Latex suspensions sensitized with one to three bacterial extracts gave serum agglutina-

tion titres equal to those observed with the corresponding individual bacterial antigens.

Fechner, J. & Meyer, W. (1960). Untersuchungen zur Pferdebrucellose. **[Brucellosis in horses.]** — Arch. exp. VetMed. **14,** 1327-1339. **2844**

Four horses were exposed to brucella by housing with infected cows. A cow aborted whilst the horses were there. Two of the horses developed fistulous withers, one 14 months, the other 32 months after exposure. *Br. abortus* was isolated from the lesions. The remaining two, one serologically positive, the other negative, were both clinically healthy. Three other horses, infected either orally or into the eye, yielded positive agglutination and c.f. titres, but remained clinically healthy up to 6 months after infection. Brucella was isolated once from the spleen and once from hepatic lymph nodes of five slaughtered horses. It was present in fistulous lesions and urine, but not in faeces, saliva, uterine secretions, blood and cerebrospinal fluid of naturally infected horses.—E.G.

Millar, R. (1961). **Disease of the ligamentum nuchae associated with Brucella abortus infection in the horse, and its treatment with strain 19.** — Brit. vet. J. **117,** 167-170. [Author's summary.] **2845**

The treatment of four cases of fistulous withers with *Brucella abortus* strain 19 vaccine is reported. The local reaction at the vaccination site was severe but subsided and the whole condition resolved.

Brodauf, H. & Krüger, G. (1961). Der Stand der Brucellosetilgung in Baden. **[Eradication of brucellosis in Baden.]**—Rindertuberk. u. Brucellose **10,** 46-50. **2846**

During 1956–59 in Baden, 378,362 herds were examined by the ring test and 898 cattle yielded positive reactions. In 299 these findings were confirmed serologically, in 38 results were doubtful. At the beginning of this period of systematic testing there were 0·44% reactors, in the last six months of 1959 the proportion fell to 0·028% and at the beginning of 1960 to 0·016%.—E.G.

Lambert, G., Amerault, T. E., Manthei, C. A. & Goode, E. R., Jr. (1961). **Further studies on the persistence of Brucella abortus infection in cattle.**—Proc. 64th Ann. Meet. U.S. Livestock Sanit. Ass., Charleston, 1960 pp. 109-117. [Authors' summary modified.] **2847**

One hundred and sixty-nine non-pregnant cattle from which *Br. abortus* had been isolated on one or more occasions were examined P.M. and cultured at intervals from three months to 11 years after exposure. Eighteen had been naturally and 151 artificially exposed to virulent *Br. abortus.* In addition, 30 were calf-vaccinated and 139 were non-vaccinated cattle.

Br. abortus was isolated from 132 of the 169 and it was demonstrated in the udder or supramammary lymph nodes of 123 of the 132 cattle. In the remaining nine animals, brucella was isolated from one or more tissues where localization does not occur frequently. The tissues in which brucella most frequently localized and persisted were: (1) supramammary lymph nodes, (2) udder, (3) iliac lymph nodes, and (4) retropharyngeal lymph nodes. Although isolations from the uterus were relatively infrequent, any genital infection should be considered highly significant in the spread of the disease. The number of isolations from tissues was relatively constant for four years after exposure, but decreased after that time.

All except four of the 132 cattle from which *Br. abortus* was isolated P.M. had sero-agglutinin titres at or above the minimal reactor level. These four were non-vaccinated cattle with suspect level titres. Brucella was not isolated from 19 of the cattle with reactor titres. Although the infection rate P.M. was somewhat lower in calf-vaccinated than in non-vaccinated cattle the general patterns of localization and persistence of brucella were comparable, as they were also between naturally and artificially infected cattle.

Anon. (1961). **Brucella abortus in milk in England and Wales in 1959.** — Mon. Bull. Minist. Hlth Lab. Serv. **20,** 33-36. [Summary modified.] **2848**

Thirty-five public health laboratories in England and Wales submitted the results of examining milk from individual herds in 1959 for tubercle bacilli and for brucella.

Organisms of the Brucella group were isolated by culture of g.pig tissues from 544 (4·8%) of 11,450 samples of herd milk. Of 390 strains examined more closely, 93·6% were *Br. abortus* or one of its varieties and 6·4% *Br. melitensis.*

Reasons are advanced for the view that the real incidence of herd infection in the country is about 15%.

Lall, H. K. & Bakshi, S. N. (1961). **Excretion of Brucella abortus in the milk of reactor animals.**—Indian vet. J. **38,** 30-36. **2849**

Cultures from milk of 16 cows and buffaloes with blood serum agglutinin titres of 1 : 20 to 1 : 320 were negative for brucella. Two g.pigs inoculated with milk from 2 cows developed titres of 1 : 640 and 1 : 40 respectively, but did not yield the organism and no thermal reaction or lesions were observed.—R. N. Mohan.

Biberstein, E. L., Cameron, H. S. & Meyer, M. E. (1961). **Brucella whey reactions in problem herds.**—J. Amer. vet. med. Ass. **138,** 244-247. [Authors' summary modified.] **2850**

The shedder state of cows with divergent results in their blood-serum and whey-agglutination tests for brucellosis was ascertained by g.pig inoculation tests. Neither test alone can detect all shedder cattle. In cases of discrepancy between the two tests, the whey test identified 14, the blood test one out of 17 shedders. The whey test appears to be most useful when applied to cows suspicious on the blood test. A positive whey test in 9 out of 12 cases was associated with the shedder state and a negative whey test in 138 of 140 cases was found in cows in which excretion of brucella organisms could not be demonstrated. Apparently the two tests can be used jointly to advantage in problem herds.

Rodabaugh, D. E. & Elder, C. (1961). **Differentiation between vaccinal and infectious brucellosis titers in cattle.**—Vet. Med. **56,** 185-189. **2851**

Standard antigen for the plate agglutination test was diluted with an equal volume of physiological saline containing 0·5% phenol. It was acidified to pH 3·0 by adding 0·04 ml. glacial acetic acid to each ml. 200 sera were examined by this method, which is a modification of that described by Rose & Roepke [*V.B.* **27,** 3506].—R.M.

Urbaschek, B. (1961). Versuche mit der abortauslösenden Lipopolysaccharid-Fraktion aus Brucella abortus. **[Abortifacient action of a lipopolysaccharide fraction of Brucella abortus.]**—Zbl. VetMed. **8,** 150-157. [Summaries in English, French and Spanish.] **2852**

A lipopolysaccharide fraction of *Br. abortus* induced contraction of the isolated uterus of g.pigs and abortion in 15 of 22 g.pigs 40–50 days pregnant, after i/m, i/v or i/p injection. Five died and two bore apparently normal litters. Of 11 rabbits, 19–20 days pregnant, three aborted after i/v doses of the endotoxin.—E.G.

Pankratov, A. Y., Egoshin, I. S. & Tret'yakova, A. A. (1961). **[Duration of excretion of Strain 19 and changes in the organs following inoculation into sheep.]** — Veterinariya, Moscow No. 3 pp. 45-46. [In Russian.] **2853**

Twenty-nine lambs aged 4 months from a brucella-free flock were each inoculated s/c with 2 ml. of Strain 19 vaccine. Blood was taken for serological tests at intervals and the lambs were killed for bacteriological examination of organs between 5 hours and 8 months after inoculation. Agglutinin titres reached a maximum of 1 : 1,600 or 1 : 3,200 on the 10th day and fell to 1 : 800 on the 15th day, 1 : 50 at 2 months and 1 : 25 at 3 months. C.f. tests were positive from 15 days until 3 months. Strain 19 was recovered from nearly all organs from 5 hours until 15 days after s/c injection. From the 15th day until 2 months after injection, it was recovered only from lymph nodes. No bacteria were recovered from lymph nodes or organs at 3, 4, 6, and 8 months after injection, except in two sheep which died from pneumonia on the 95th and 108th days. Inflammatory reaction at the site of inoculation was greatest during the first 10 days, and the swelling was completely absorbed by the 6th month. Histological study of organs revealed stimulation of cells of the reticulo-endothelial system during the first 45 days, returning to normal after 2 months.

—R.M.

Hejzlar, M. & Duniewicz, M. (1961). Versuche mit einer verbesserten Technik der Keimanzüchtung bei Brucellosekranken. **[Improved culture medium for isolating brucella from body fluids and tissues.]** — Zbl. Bakt. I. (Orig.) **181,** 493-502. [Summaries in English, French, Spanish and Russian.] **2854**

Using a semi-synthetic agar medium containing a number of growth factors, vitamins, polymyxin, bacitracin, tryptose phosphate and filtrate of chick embryo extract, *Br. abortus* was isolated from five sternal biopsy samples and one blood sample of 18 human patients which had been infected by contact with cattle. Using tryptose agar, *Br. abortus* was isolated from 3, and using liver broth peptone agar, from 2 of the sternal biopsy samples.—E.G.

Gamčík, P. (1961). Epididymitis der Schafböcke in der Slowakei. (Diagnostik, Klinik, Spermiogramm). **[Epididymitis in rams in**

Slovakia: diagnosis, clinical picture and semen.] — Zuchthyg. FortpflStörung. u. Besamung **5**, 81-97. [Summaries in English and Russian.] **2855**

A version in German of work previously published in Slovak [*V.B.* **31**, 1736].—E.G.

Stolbikov, E. P. (1961). **[Use of rivanol for obtaining fluorescent gamma globulin from hyperimmune brucellosis serum.]** — Veterinariya, Moscow No. 3 pp. 76-79. [In Russian.] **2856**

Rivanol is 6, 9-diamino-2-ethoxyacridine lactate. It was used to extract gamma-globulin from bovine or ovine hyperimmune sera: 3·5 parts of 0·4% rivanol soln. were added to 1 part of fresh or phenolized serum. The mixture was allowed to stand for 30 min., then centrifuged. Rivanol was removed from the supernatant by adding a predetermined amount of activated carbon. After repeated centrifugation and filtration to remove the carbon, the fluid obtained was concentrated under vacuum and conserved at freezing point. Gamma globulin obtained by this method and labelled with fluorescein isocyanate possessed similar properties to labelled globulin prepared by precipitation with ammonium sulphate, but was easier to prepare.—R.M.

Parnas, J. (1961). Weitere Untersuchungen über die Anti-Brucella-Bakteriophagen. **[Further studies on anti-brucella bacteriophages.]** —Zbl. VetMed. **8**, 175-191. [Summaries in English, French and Spanish.] **2857**

The action of 18 bacteriophages on 244 brucella strains was reported. Bacteriophages are considered to play an important part in the variability and genetics of brucella.—M.G.G.

Nazar, T. (1961). Zastosowanie i ocena odczynu śródskórnego przy brucelozie u psów. **[Intradermal test for brucellosis in dogs.]**—Med. Wet., Warszawa **17**, 73-74. [In Polish.] **2858**

Of 109 dogs examined for brucellosis 26 gave a positive reaction to the complement-fixation test, 27 to the intradermal test but none to the blood agglutination test (25 positive to both c.f. and intradermal tests, one to the c.f. test and 2 to the intradermal test only). For the intradermal test Burnet's reagent was used and the optimum reaction, in the form of elevated temperature and skin erythema at the site of injection, was noted 48–72 hours after inoculation.—M. Gitter.

Nižnánsky, F. (1961). Výskyt brucelózy ošípaných v ČSSR a biologické vlastnosti porcinných brucelových kmeňov. **[Porcine brucellosis in Czechoslovakia.]**—Čsl. Epidem. Mikrobiol. Immunol. **10**, 31-39. [In Slovak. Summaries in English and Russian.] **2859**

During 1951–58 in Slovakia, 51 strains of *Br. suis* were isolated from pig testicles, aborted foetuses, and placentas, whereas strains isolated from pigs in Bohemia were mainly *Br. abortus*. Details were given of differentiation of *Br. suis* by determination of amylase, lipase, peroxydase and urease activity. Transmission of *Br. abortus* from cattle to pigs was stated to be rare.—E.G.

Stirling-Mócsy, M. (1961). A komplementum-kötési próba alkalmassá tétele a sertések brucellás fertőzöttségének kimutatására. **[Complement-fixation test for brucella in pigs.]**—Mag. állator. Lapja **16**, 14-16. [In Hungarian. Summaries in English and Russian.] **2860**

S. studied critically the c.f. test for porcine brucellosis because pig's serum contains the third thermostable component of complement in unusually high proportions, and might, therefore, give a false negative reaction. In a survey of several hundred thousand sera, results of c.f. tests were compared with those of agglutination tests: 88% were negative to both tests, 4·8% were positive to agglutination only, 2% were positive to c.f. only and 5·2% were positive to both tests. The protein components of 76 sera were analysed by electrophoresis. No significant difference was found in the composition of the protein fractions of the sera which were positive only with the c.f. test, and that of sera reacting differently. It was concluded that positive c.f. results may be accepted. The use of the c.f. test in conjunction with the agglutination test for the routine detection of brucellosis was suggested.

S. developed a method, described in detail, for eliminating the interfering complement factor. Addition of 2 mg. zymosan in 0·1 ml. of 0·9% saline to each serum sample neutralizes the factor. Of 116 samples from infected pigs which gave negative c.f. results, 35 were positive after treatment with zymosan. S. suggested that this modified test might be employed for experimental pigs, or for breeding animals to be admitted into brucella-free herds, as it is rather elaborate for routine use.—A. Sebesteny.

Kardeván, A. & Kemenes, F. (1961). A mezei nyulak brucellosisa hazánkban. **[Brucellosis in hares in Hungary.]**—Mag. állator. Lapja

16, 59-61. [In Hungarian. Summaries in English and Russian.] **2861**

In a survey of 250 carcasses, 17, mainly from the northern and north-western parts of Hungary, were infected with a strain of brucella resembling biochemically and serologically the Danish variety of *Br. suis*. The infection manifested itself in a chronic granulomatous condition, which did not seem to be highly fatal, its only effect being emaciation in some animals. The granulomata were small nodules with necrotic centres surrounded by histiocytes and fibrous tissue scattered in the substance of the spleen, liver, lungs, testicles, uterine wall and subcutaneous tissues. The incidence in both hares and domestic animals was related in certain regions. The authors, nevertheless, do not consider that hares play an important role in the maintenance of the disease amongst domestic animals except in countries like Denmark, where the disease has been eradicated in domestic animals and hares may be a source of infection.—A. SEBESTENY.

Morgan, W. J. B. (1961). **The use of the thionin blue sensitivity test in the examination of brucella.**—J. gen. Microbiol. **25**, 135-139. [Author's summary modified.] **2862**

M. examined 171 cultures mostly isolated in Gt. Britain from milk and foetal material, for sensitivity to thionin blue as well as to basic fuchsin and thionin, and for agglutination in monospecific sera. Standard strains of *Brucella abortus*, *Br. melitensis* and *Br. suis* grew in the presence of thionin blue in the concentration studied. Three groups of *Br. abortus* were found, however, which were sensitive to thionin blue. These were: (a) strains resembling Strain 19; (b) dye sensitive strains (*Br. abortus* type II Wilson), (c) a previously undescribed group. This last group required added CO_2 for growth, grew on basic fuchsin and were virulent for g.pigs.

Vershilova, P. A. (1961). **The use of live vaccine for vaccination of human beings against brucellosis in the USSR.**—Bull. World Hlth Org. **24**, 85-89. [Summary in French. Author's summary modified.] **2863**

Most human brucellosis cases in the USSR are caused by contact with infected sheep and goats. Extensive action has been taken to prevent human infection and to reduce the incidence among farm animals, the main prophylactic measure in recent years being vaccination with live brucellosis vaccine. The author summarizes the steps leading to the development of a satisfactory vaccine and describes briefly the method of preparation. Discussing the results obtained, she states that there has been a nearly 60% reduction in the number of human cases over the period 1952–58.

Subcutaneous administration is usual, but preliminary figures suggest that cutaneous vaccination is equally effective, although in persons who have suffered from active brucellosis it causes strong reactions and may lead to exacerbation of the disease. Research is going forward into the development of a cutaneous vaccine suitable for general use.

Hughes, D. E. & Keech, H. L. (1961). **An epizootic of leptospirosis in institutional herds of cattle and swine.**—Proc. 64th Ann. Meet. U.S. Livestock Sanit. Ass., Charleston, 1960 pp. 143-150. [Authors' summary modified.] **2864**

A study of leptospirosis was made in five herds of cattle and one of pigs. Of 40 cattle which developed agglutination-lysis titres, 14 were pregnant and six aborted. *Leptospira pomona* was isolated from the urine of six cows including three that had aborted. Of 69 pigs which developed positive titres, 63 were pregnant sows and five aborted. *L. pomona* was isolated from kidney tissues of two sows that had aborted.

In two herds infection was introduced by newly purchased cattle; in the other cattle herds and in the pigs the source was not found.

Spread of infection was believed to have been controlled by repeated testing and segregation of cattle with high or rising titres.

Antibodies were found in cattle serum when tested against 11 leptospiral serotypes. The possible significance of five serotypes was suggested by titres of 200 and also by isolation of four of these five from wild and domestic animals.

Seibold, H. R., Keech, H. & Bokelman, D. L. (1961). **Histopathologic and serologic study of subclinical leptospirosis among cattle.**—J. Amer. vet. med. Ass. **138**, 424-430. [Authors' summary modified.] **2865**

Microscopic evidence of active or previous infection was found in the kidneys of 292 (86%) of 338 cattle received at the Plum Island Animal Disease Laboratory during one year. Focal lesions in the acute, subacute, and chronic stages were observed. Lesions in the acute stage consisted of necrosis of tubular epithelium in the renal cortex; those of the

subacute stage were characterized by proliferation of undifferentiated epithelial lining cells and by progressive interstitial lymphocytic infiltration. Chronic lesions were characterized by atrophy of the affected tubules, with thickening of the basement membranes. Eventual regression of the chronic lesions was observed.

Leptospires were found in acute and early subacute lesions, but with development of the lymphocytic infiltration, they disappeared and were never found in the advanced subacute or chronic lesions. In renal carriers, organisms persisted in certain small tubules at the corticomedullary junction only, where they produced no visible histological lesions. Four cattle had leptospires in lesions, and 57 in undamaged tubules at the corticomedullary junction.

Agglutination-lysis tests for *L. pomona* antibodies were made on single serum samples from these cattle from 20 to 190 days before tissues were taken for histological examination. There was no correlation between serological and histological findings. The data suggest (1) possible infection after the serological tests had been made and (2) infection with other serotypes.

Morter, R. L. (1961). **A hemolytic phenomenon in ewes requiring Leptospira pomona antigen and antibody.**—Proc. Soc. exp. Biol., N.Y. **106,** 600-603. [Author's summary modified.] **2866**

Haemoglobinuria and haemoglobinaemia in ewes followed i/v inj. of disrupted *L. pomona* cells. Haemolysis occurred only in presence of antibody. It is postulated that the haemolytic effect is due to interaction of a cellular component, antibody and red blood cells.

Bauer, D. C., Eames, L. N., Sleight, S. D. & Ferguson, L. C. (1961). **The significance of leptospiral hemolysin in the pathogenesis of Leptospira pomona infections.** — J. infect. Dis. **108,** 229-236. [Authors' summary modified.] **2867**

L. pomona haemolysin was precipitated and concentrated from culture filtrates by ammonium sulphate. I/v injection of this material into lambs aged 2–4 weeks resulted in haemolytic anaemia evidenced by icterus and haemoglobinuria. Animals with a leptospiral serum agglutinin titre were protected from the effects of the haemolysin. When lambs were given a series of injections of low levels of haemolysin, no increase in haemolysin inhibition titres could be detected in their serum.

In vitro the haemolysin was adsorbed to both sheep and g.pig erythrocytes, but only the sheep cells were lysed. Leptospiral antiserum inhibited haemolysis if added to the haemolysin before the addition of erythrocytes; if added with or after the erythrocytes it caused decreased inhibition.

The significance of the haemolysin in the pathogenesis of leptospirosis is discussed.

Smith, C. E. G., Turner, L. H., Harrison, J. L. & Broom, J. C. (1961). **Animal leptospirosis in Malaya. 1. Methods, zoogeographical background, and broad analysis of results.** — Bull. World Hlth Org. **24,** 5-21. [Summary in French. Authors' summary modified.] **2868**

Leptospirosis is an important cause of human febrile illness in Malaya. In studies to determine its animal reservoirs and the factors influencing spread of infection from them to man and domestic animals, a wide range of animal species were trapped in forests, rice-fields, areas of scrub and cultivation and in several towns and villages. The maintenance hosts in Malaya appear to be mainly or entirely rats, although evidence of infection has been found throughout the animal kingdom. Some rat species have characteristics which suggest that they are better maintenance hosts than others. Evidence was found that practically every serogroup of leptospires infected animals in Malaya. Together 104 strains were isolated and identified, and 155 animals had serological evidence of infection. Of 1,763 rodents examined, 194 had evidence of infection, and 41 of 1,083 other animals. A serum survey of domestic animals revealed the highest incidence of antibodies in goats and the lowest in oxen.

Šebek, Z. (1961). Izolace leptospir ze skupiny australis v Českých zemích. **[Isolation of L. australis in Czechoslovakia.]** — Čsl. Epidem. Mikrobiol. Immunol. **10,** 68-72. [In Czech. Summaries in English and Russian.] **2869**

Of 39 hedgehogs, serologically examined in a district of Bohemia, 17 were positive for *L. australis,* 3 for *L. sejroe* and 2 for *L. grippo-typhosa.* Leptospires were demonstrated microscopically in the kidneys of nine. Six strains were isolated and identified as *L. australis.* In the same district antibodies were demonstrated in cattle, pigs and dogs and

in free-living mammals such as foxes, hares, wood mice *(Apodemus sylvaticus)* and shrews *(Sorex araneus)*. Human infection has, so far, not been reported from this district.

—E.G.

Angeloff, S. (1960). Die Leptospirosen der Haustiere und ihre Beziehung zu der Leptospirose des Menschen. **[Leptospiral infections in domestic animals and man in Bulgaria.]**—Arch. exp. VetMed. **14**, 1170-1174. **2870**

Human leptospirosis in Bulgaria has increased in recent years. Since 1946 there have been several outbreaks, involving 934 people. Of 776 serum samples from various animals, 35 were positive for *L. pomona*. Of these 16 were from cattle, 11 from horses and 8 from pigs. *L. hyos* was demonstrated in 17, *canicola* in 17, *bovis* in 10, *grippo-typhosa* in 6, *icterohaemorrhagiae* in 2, and *bataviae* in one. Eleven samples positive for *pomona* and one for *canicola* were from horses with periodic ophthalmia.

Eight samples positive for *L. pomona* were from pigs from an area where there had been an outbreak in man. Fowls, ducks, geese, turkeys and chick embryos were not susceptible to infection.—E.G.

McKiel, J. A., Cousineau, J. G. & Hall, R. R. (1961). **Leptospirosis in wild animals in eastern Canada with particular attention to the disease in rats.**—Canad. J. comp. Med. **25**, 15-18. [Authors' abst. modified.] **2871**

A survey in wild mammals has been in progress for two years in eastern Canada. Most of the animals tested were rats *(Rattus norvegicus)*.

The overall incidence of infection with *L. icterohaemorrhagiae* in rats was 23%, two areas had infection rates of 39%. While *L. icterohaemorrhagiae* was the only serotype isolated from rats, two rat sera reacted with *L. pomona* but not with other serotype antigens tested. There was no significant difference between the percentages of rats classified as (a) positive by serology as well as by culture, (b) positive by serology but negative by culture, or (c) negative by serology but positive by culture.

Of the mammals other than rats, two ground hogs *(Marmota monax)* and two striped skunks *(Mephitis mephitis)* had antibodies to *L. pomona*. *L. pomona* was isolated from the kidneys of one of the ground hogs.

Carbrey, E. A. (1961). **The relative importance of variable factors in the agglutination-lysis test.**—Proc. 64th Ann. Meet. U.S. Livestock Sanit. Ass., Charleston, 1960 pp. 130-142. [Author's summary modified.] **2872**

The agglutination-lysis test for leptospirosis was studied to determine which factors in the test could be altered so as to produce significant changes in serum titres. Among the factors not considered to be important sources of variation were: test incubation temperature, standardization of antigen, and serum dilution preparation. Other factors were quite sensitive. The use of different dilution schemes, antigen strains, and test readers effectively altered serum titres. Antigen density was a serious source of variation only when the changes in density were extreme. A standard method of performing the agglutination-lysis test is necessary.

Roth, E. E., Linder, D. & Adams, W. V. (1961). **The use of agar plates as an aid for the isolation of leptospires.**—Amer. J. vet. Res. **22**, 308-312. [Authors' summary modified.] **2873**

The agar plate method, used along with semi-solid media, increased the isolations of leptospires from the kidneys of naturally infected wild animals and warranted its routine use. It can be used for estimation of the number of leptospires in the kidneys. Of 93 isolations, 50 were obtained from both agar plates and semi-solid media. Thirty strains were recovered in semi-solid media only; whereas 13 strains were recovered by the agar plate method but were not recovered in semi-solid media.

Schuchardt, L. F., Brightenback, G. E. & Prier, J. E. (1961). **An improved Leptospira pomona bacterin.** — Proc. 64th Ann. Meet. U.S. Livestock Sanit. Ass., Charleston, 1960 pp. 49-57. [Authors' summary modified.] **2874**

Rabbit serum in regular *L. pomona* killed vaccines has been implicated as the cause of anaphylactoid reactions. An improved vaccine essentially free from rabbit serum has been developed. This vaccine does not produce anaphylactic reactions in g.pigs. Clinical studies in cattle revealed an adequate response to the vaccine. No anaphylactic reactions occurred in over 2,000 cattle vaccinated with this improved product.

Kmety, E. & Bakoss, P. (1961). Hämolysin- und Lipaseproduktion bei Leptospiren verschiedener Serotypen. **[Production of haemo-**

lysin and lipase by various serotypes of Leptospira.] — Zbl. Bakt. I. (Orig.) **181,** 503-515. [Summaries in English, French, Spanish and Russian.] **2875**

Haemolysin production was observed in *Leptospira pomona* and *L. grippo-typhosa,* lipase production among others in *L. australis, L. canicola, L. pomona* and *L. ictero-haemorrhagiae.* Since there did not appear to be any interdependence between the two characteristics, nor were they related to virulence, the classification of serotypes into lipase or haemolysin-positive or negative variants was rejected.—E.G.

Smith, C. E. G. & Turner, L. H. (1961). **The effect of pH on the survival of leptospires in water.** — Bull. World Hlth Org. **24,** 35-43. [Summary in French. Authors' summary modified.] **2876**

One of the factors on which the incidence of leptospirosis is dependent is the survival time of shed leptospires in surface water or soil water which is affected by the acidity or alkalinity of the water. The survival of four leptospiral serotypes in buffered distilled water at pH's ranging from 5·3 to 8 was studied. All survived longer in alkaline than in acid water, and significant differences between the serotypes were found in response to pH. Survival at pH under 7·0 ranged from 10 to 117 days and at pH over 7·0 from 21 to 152 days. In aqueous extracts of soil samples from different areas in Malaya, no correlation was found between pH and survival time.

In a group of Malayan rice-fields a low incidence of leptospirosis in man was accompanied by a high infection rate among rodents; this phenomenon could not be explained by pH or salinity, and attention was turned to the soil. Bentonite clay, similar to the montmorrillonite clay of the rice-fields, was found to adsorb about half the leptospires in suspension. The authors recommend that field study of this laboratory observation be undertaken.

Erdman, I. E., Thatcher, F. S. & MacQueen, K. F. (1961). **Studies on the irradiation of microorganisms in relation to food preservation. I. The comparative sensitivities of specific bacteria of public health significance. II. Irradiation resistant mutants.**—Canad. J. Microbiol. **7,** 199-205 & 207-215. [Authors' absts. modified.] **2877**

I. Spores of *Cl. botulinum* Type A were more resistant to radiocobalt irradiation than those of Type E, while 6 strains of staphylococci showed similar tolerances. The most sensitive species of those tested was *M. tuberculosis.* Coliform organisms were more sensitive than salmonellae, which were more sensitive than staphylococci and *Str. faecalis.* Destruction of coliform bacteria in irradiated foods cannot, therefore, be used as an index of adequate pasteurization. Staphylococcal emetic toxin in pork sausage and in culture filtrates was destroyed by irradiation at comparatively low levels in contradistinction to the findings for botulinum toxin.

II. Using radiocobalt, repeated irradiation of survivors of bacterial cultures at a level initially destroying a high proportion of cells gave rise to strains which were more resistant than the originals. Development of resistance was shown in single strains of *E. coli, Str. faecalis,* and *Cl. botulinum* Type A, and in one of 3 strains of *Staph. aureus,* but not in 2 strains of *Cl. botulinum* Type E nor in *S. gallinarum.* Changes were noted in phage patterns of the staphylococci, biochemical characteristics of *E. coli,* and toxin production of *Cl. botulinum* in response to repeated irradiation. Irradiation of parent and resistant cultures at −78°C. did not change their comparative resistance, though each was afforded some protection at this temp. These findings suggest that the induced resistance is an expression of resistance to the primary effect of irradiation and not to possible toxic substances formed by interaction of free radicals.

Jensen, R., Miller, V. A. & Molello, J. A. (1961). **Placental pathology of sheep with vibriosis.**—Amer. J. vet. Res. **22,** 169-185. [Authors' summary modified.] **2878**

Placental changes in experimental and spontaneous vibriosis were similar. In advanced disease, the uterus was oedematous, especially at the lesser curvature. Placentomes were swollen, and the chorion contained many foci of oedema. Infected cotyledons were abnormally pale and separated easily from caruncles.

Histologically, the changes were concentrated in the hilar zone of placentomes. Septa had arteriolitis and some thrombosis. Bacteria were abundant in haematomas of the lacunas. In the advanced stages, colonies of *V. fetus* were found in the cytoplasm of many chorionic epithelial cells and in the endothelium and lumen of adjacent chorionic

capillaries. Chorionic epithelium of the villi desquamated into the space between septa and villi.

The gross lesions of infected placentas and the demonstration of *V. fetus* in stained smears from cotyledons provided an easy and accurate basis for field diagnosis.

Rosen, F. S., Kevy, S. V., Merler, E., Janeway, C. A. & Gitlin, D. (1961). **Dysgammaglobulinaemia and recurrent bacterial infection.**—Lancet, April 1st, 700. [Authors' summary.] **2879**

Two children with recurrent bacterial infections were studied. They had an increased serum concentration of 19S γ-globulins and certain antibodies, such as isohaemagglutinins, and a marked deficiency of 7S γ-globulins.

Hauptman, B., Jasińska, S. & Sielicka, B. (1961). Zakaźenie owiec droźdźakami. **[Candida infection in sheep.]**—Med. Wet., Warszawa **17,** 22-24. [In Polish. Summaries in English, French, German and Russian.] **2880**

In an outbreak in a flock of 545 Merino sheep the affected animals showed initially nasal and eye discharge, then became dull and ceased to eat. Nervous symptoms and incoordination of movement were noted also. The temperature was normal and death occurred after a few days of illness. P.M. examination of 8 animals revealed haemorrhages on the dura mater and congestion of cerebral blood vessels. *Candida guilliermondii* was isolated from liver, spleen, kidneys and brain. *Listeria* infection had been suspected but bacteriological and serological examinations were negative.—M. Gitter.

Mourad, S. & Friedman, L. (1961). **Pathogenicity of Candida.**—J. Bact. **81,** 550-556. [Authors' summary modified.] **2881**

Mice were injected by various routes using 1×10^2, 1×10^4, 1×10^6, and 1×10^8 viable particles of a single strain of *Candida albicans*. The i/v route was chosen because of resultant prolonged infection with smaller doses. In a screening of strains with 1×10^4 particles inoculated i/v, 11 strains were avirulent, 7 caused fatal infection in 3 to 4 of 5 mice, and 14 were of intermediate virulence. Five strains were selected for more extensive studies. Very large dosages of most strains caused death almost immediately, but by proper selection of the strain and the dosage, it was possible to induce death from infection within 2 to 7 weeks.

Soluble substances, obtained by sonic oscillation of *C. albicans*, were lethal for mice when inoculated i/v. Similarly, toxic substances were demonstrated also in species of non-human origin.

Mourad, S. & Friedman, L. (1961). **Active immunization of mice against Candida albicans.**—Proc. Soc. exp. Biol., N.Y. **106,** 570-572. [Authors' summary modified.] **2882**

Mice given repeated s/c inoculations of living, thiomersal-killed, or sonically-ruptured cells of *C. albicans* were challenged i/v with 10^4 or 10^5 viable particles of a homologous strain. Although not all survived challenge, a significant degree of resistance was conferred since fewer deaths occurred among inoculated animals.

Clarke, R. T. J. & Di Menna, M. E. (1961). **Yeasts from the bovine rumen.** — J. gen. Microbiol. **25,** 113-117. [Authors' summary modified.] **2883**

Yeasts belonging to the genera *Candida* and *Trichosporon* were isolated in small numbers from the rumen of fistulated cows. Similar yeasts were not found on samples of feed material. The yeasts present fell into two groups depending on the diet of the cow from which they were isolated.

Dekeyser, J., Delcambe, L. & Thienpont, D. (1960). Activité thérapeutique de l'iturine et du chinosol sur la teigne du cheval à Microsporum equinum Bodin. **[Treatment of ringworm in horses with iturine and chinosol.]**—Bull. epiz. Dis. Afr. **8,** 279-288. [In French. Summary in English.] **2884**

M. equinum was isolated on several occasions from horses with ringworm in Ruanda-Urundi and the Congo. In natural and experimental cases of the disease lesions treated daily with 5% iturine or 0·1% oxyquinoline sulphate were free from the fungus after 2–10 weeks. Iturine is an antibiotic prepared from a spore-forming bacillus isolated in Ituri, Congo, by L. Delcambe.

—M.G.G.

Pier, A. C. & Hughes, J. P. (1961). **Isolation of Keratinomyces ajelloi from skin lesions of a horse.**—J. Amer. vet. med. Ass. **138,** 484-486. [Authors' summary.] **2885**

Keratinomyces ajelloi was isolated repeatedly from superficial lesions of the skin of a horse. The organism was also isolated from the corral soil but not from other horses on the premises. The fungus is described and

a brief history of this geophilic dermatophyte is given.

Chwalibóg, J. (1961). Aspergiloza gęsi. **[Aspergillosis in geese.]** — Med. Wet., Warszawa **17**, 71-72. [In Polish.] **2886**

In a population of about 20,000 geese, some 9–24 died daily for about 2 months. No clinical symptoms were noted in the early stages of the outbreak but later dulness, anorexia, dyspnoea and diarrhoea were seen. P.M. examination revealed numerous yellow granules in the lungs and spleen, thick, leathery air sacs and congestion of the intestinal mucosa. *Aspergillus fumigatus* was isolated in every case and the origin of the infection was traced to mouldy oats from which *A. fumigatus* was isolated. Treatment by intratracheal injections of iodine soln. was not successful.—M. Gitter.

El Nasri, M. (1961). **Some observations on bovine farcy.** — Vet. Rec. **73**, 370-372. [Author's summary modified.] **2887**

Bovine farcy is rare in most parts of the Sudan but common in the Nuba Mountains and neighbouring areas.

The morphology and staining properties of the organism are described.

Two cases of udder infection believed to be part of generalised infection are described and discussed.

Foggie, A. (1961). **Eperythrozoon infection in sheep in Scotland.** — Vet. Rec. **73**, 453-454. **2888**

Two separate foci of *Eperythrozoon ovis* infection of sheep were demonstrated in Scotland by examination of blood smears. The infection was transmitted by i/v injection of blood. It was characterized by a haemolytic anaemia lasting 4–8 weeks.—M.G.G.

See also absts. **3031** (U.N. report, control of animal diseases in Saudi Arabia); **3114** (report, Bechuanaland).

DISEASES CAUSED BY PROTOZOAN PARASITES

Williamson, J. & Stephen, L. E. (1961). **Suramin complexes. VII. Further attempts to overcome the ethidium complex injection-site reaction.**—Ann. trop. Med. Parasit. **55**, 97-106. [Authors' summary.] **2889**

Six different methods of presentation of ethidium-suramin complex were tested as possible expedients for eliminating or reducing the severe local reaction which follows subcutaneous injection of the drug in cattle.

The drug was presented (i) as a water-in-oil emulsion, and as mixtures with (ii) antrycide chloride, (iii) other suramin complexes, (iv) serum, (v) gelatin and (vi) glycyrrhetinic acid. None of these expedients was successful.

Some aspects of combination treatment in animal trypanosomiasis are discussed.

Leach, T. M. (1961). **Observations on the treatment of Trypanosoma evansi infection in camels.** — J. comp. Path. **71**, 109-117. [Author's conclusions modified.] **2890**

The results of treatment of camels in an outbreak of surra are recorded. The strain of trypanosome was resistant to 5 g. suramin, but susceptible to 2 g. Antrycide methyl-sulphate. Berenil (3·5 mg./kg.) was ineffective possibly as a result of cross-resistance developed after treatment with suramin. Berenil (7 mg./kg.) was highly toxic to adult camels. The diagnostic value of the mercuric chloride test was confirmed.

Tobie, E. J. (1961). **Experimental transmission and biological comparison of strains of Trypanosoma rangeli.**—Exp. Parasit. **11**, 1-9. [Author's summary modified.] **2891**

Different strains reacted differently in the rat and in the invertebrate host *Rhodnius prolixus*. The survival of *T. rangeli* in the bloodstream of the rat and infections in the intestine, haemolymph, and salivary glands of *R. prolixus* were discussed. Evidence suggested that *R. prolixus* may not be the natural invertebrate host for all strains of *rangeli* or that trypanosomes designated *rangeli* actually represent more than one species. Passage through the insect host enhanced the ability of one strain to invade the salivary glands after inoculation into the haemocoele. Maintenance of the strain was thus possible by cyclical transmission.

Walker, P. J. & Ashwood-Smith, M. J. (1961). **Dimethyl sulphoxide, an alternative to glycerol, for the low-temperature preservation of trypanosomes.**—Ann. trop. Med. Parasit. **55**, 93-96. [Authors' summary modified.] **2892**

Dimethyl sulphoxide (5%) and glycerol (10%) are equally effective for low-temperature preservation of trypanosomes. The lower toxicity of dimethyl sulphoxide both to the host and to the parasite suggests that it may be a useful alternative to glycerol for

low-temperature preservation of trypanosomes.

Lucas, J. M. S. (1961). **1,2-dimethyl-5-nitroimidazole, 8595 R.P. I. Prophylactic activity against experimental histomoniasis in turkeys.** —Vet. Rec. **73,** 465-467. [Author's summary modified.] **2893**

In turkeys infected with enterohepatitis (by oral dosing with *Heterakis gallinae*) "8595 R.P." was more potent than acinitrazole (2-acetamido-5-nitrothiazole) or nithiazide [1-ethyl-3-(5-nitro-2-thiazolyl) urea] when fed as a preventive, commencing 48 hours before infection.

Welter, C. J. & Clark, D. T. (1961). **The efficacy of p-ureidobenzenearsonic acid as a preventative of histomoniasis in turkey poults.** —Poult. Sci. **40,** 144-147. [Authors' conclusions modified.] **2894**

Mortality and lesions due to *Histomonas* and the incidence of the organism in the caeca were reduced considerably by the continuous administration of the drug starting one week before infection.

No untoward symptoms nor gross pathological changes were observed which could be attributed to the drug.

I. Cordero del Campillo, M. & Fernandez González, J. (1960). Presencia de la coccidiosis bovina en España. **[Presence of bovine coccidiosis in Spain.]**—Rev. ibér. Parasit. **20,** 15-22. **2895**

II. Cordero del Campillo, M. (1960). Nuevos casos de coccidiosis bovina en Leon: denuncia de Eimeria bovis, E. auburnensis y E. ellipsoidalis. **[Further cases of bovine coccidiosis in Leon: E. bovis, auburnensis and ellipsoidalis.]**—Ibid. 189-198. [Summary in English.] **2896**

I. *Eimeria zürni* infection was recorded for the first time in Spain. Half of a batch of 100 cattle were found to be infected, and 7 (aged 1–2 years) died. Sulphadimidine therapy was effective.

II. Three further outbreaks were discovered in Leon province. In one region *E. zürni* was associated with *E. auburnensis;* in another, *bovis, auburnensis* and *ellipsoidalis* occurred together.—R.M.

Pellérdy, L. (1961). Vizsgálatok a baromfi-coccidiosis elleni egyes gyógyszerek és védekezési eljárások használhatóságárol. I. Osszehasonlíto vizsgálatok a nicarbazin, nitrofurazon és furazolidon hatásárol. II. Adatok a coccidiosis elleni immunitás fejlödéséhez. **[Chemotherapy and prevention of avian coccidiosis. I. Comparison of nicarbazin, nitrofurazone and furazolidone. II. Immunity.]**—Mag. állator. Lapja **16,** 10-13 & 57-58. [In Hungarian. Summaries in English and Russian.] **2897**

I. The comparative efficacy of nicarbazin, nitrofurazone and sulphaquinoxaline for the treatment of *Eimeria tenella* coccidiosis of chicks was assessed by the rate and rapidity of mortality and P.M. changes. Groups of 22–26 chicks received daily doses of 0·0125% in the food. Administration began on the 5th day of age and challenge was with 5,000 oocysts of *E. tenella* on the 9th day. Of the control group 12 and of the sulphaquinoxaline group 3 died with a typical P.M. picture of *E. tenella* coccidiosis; but in the groups treated with nicarbazin and nitrofurazone only one died, one day later than those in the other groups, with mild P.M. changes.

In another experiment 3 groups of 31 chicks were infected 2 days after the commencement of the same treatment, with the same strain of *E. tenella.* These groups were exposed to adverse conditions unintentionally. Of those given sulphaquinoxaline, 11; of those given nicarbazin, 3; and of those given nitrofurazone, 2 died. It was concluded that nicarbazin and nitrofurazone are superior to sulphaquinoxaline.

In a third experiment nitrofurazone and furazolidone were compared. Daily doses of 0·04% furazolidone, 0·04% furazolidone plus 0·0125% nitrofurazone, and 0·0125% nitrofurazone in the food were administered to each of 3 groups of 42 chicks. On challenge with 20,000 oocysts of *E. tenella* at the 6th day of age, deaths in the control group were 24, and in the group given nitrofurazone alone, 3; but all those receiving furazolidone survived. It was concluded that furazolidone at 0·04% in the food is more effective than nitrofurazone at 0·0125%. In field tests nitrofurazone was in all respects superior to sulphaquinoxaline.

II. The development of immunity against *E. tenella* was studied in 3 groups of 33 chicks by imitating natural exposure. One group ("U") received 0·04% Ultraseptyl (sulphathiazole), another ("S") received 0·0125% sulphaquinoxaline in the food from the first day of life, and the third was untreated. All were reared in a coccidium free environment. When they were 5 days old, sporulated oocysts of *E. tenella* were sprayed on to the chicks and their food and drinking

water to give an estimated dose of 30–80 oocysts per chick. From that day only normal measures were taken against the spread of infection. A mild form of coccidiosis was observed in some of the birds, and one chick of group "S" died. At the 28th day of age each bird was given 5,000 oocysts without ill effects. After a further challenge with 15,000–20,000 oocysts 5 days later, all remained unaffected, except for 2 in the control group, which died. It was concluded that light infection at an early age gives adequate protection against moderate infections at a later age. But hygienic measures and coccidiostats are still necessary to obviate exposure to heavy infections against which acquired immunity cannot protect.

—A. Sebesteny.

Al-Dabagh, M. A. (1961). **Synergism between coccidia parasites (Eimeria mitis and E. acervulina) and malarial parasites (Plasmodium gallinaceum and P. juxtanucleare) in the chick.** — Parasitology **51,** 257-261. [Author's summary modified.] **2898**

Infection with *E. acervulina* and *E. mitis* caused a recrudescence of *Pl. juxtanucleare* infection in chicks harbouring chronic infection. More plasmodia appeared in the blood if the coccidial infection was produced during the prepatent period, but the length of patent and prepatent periods and the mortality rate were not affected. *E. acervulina* induced a severe fatal relapse in chicks with latent *Pl. gallinaceum* infection.

Ingram, R. L., Otken, L. B., Jr. & Jumper, J. R. (1961). **Staining of malarial parasites by the fluorescent antibody technic.**—Proc. Soc. exp. Biol., N.Y. **106,** 52-54. [Authors' summary modified.] **2899**

Two species of *Plasmodium* have been stained by the fluorescent antibody technique. *Pl. cynomolgi bastianellii* was stained with antibodies obtained from convalescent Rhesus monkeys experimentally infected with the parasite. The erythrocytic stage of *Pl. gallinaceum* was stained with antibodies produced in rabbits by injections of the sporozoite stage of the organism.

Wende, N. M. & Dienst, R. B. (1961). **Endemic toxoplasmosis in isolated swine and cattle herds and its relationship to a human population.**—Proc. Soc. exp. Biol., N.Y. **106,** 400-401. **2900**

In a small area of Georgia there was a high incidence of positive reactions to the methylene blue dye test for toxoplasma in cattle and pigs. Toxoplasmin skin tests were done on human beings in the same area and half of 86 persons in contact with the animals reacted. There was no relationship between positive reactions and consumption of meat from the animals.—R.M.

Hartley, W. J. (1961). **Experimental transmission of toxoplasmosis in sheep.** — N. Z. vet. J. **9,** 1-6. [Author's summary modified.] **2901**

Pregnant and non-pregnant maiden ewes were infected to study transmission of ovine toxoplasmic perinatal mortality. Transmission was effected when pregnant ewes were inoculated with proliferative forms of *Toxoplasma* by the intravenous and subcutaneous routes but not by oral, intranasal and intravaginal routes. No immunity was conferred when ewes were inoculated with live proliferative forms 40 days before mating and challenged in mid-pregnancy.

Kulasiri, C. & Prasad, H. (1961). **A note on the behaviour of an avirulent strain of Toxoplasma gondii in some B-vitamin deficient chicks.**—Parasitology **51,** 265-267. [Authors' summary modified.] **2902**

No difference in susceptibility or distribution of avirulent toxoplasms was observed between chicks deficient in biotin, pantothenic acid, nicotinic acid, riboflavin and heat-labile vitamins and normal controls. Ordinary diet supplemented with cod-liver oil had no influence. Avirulent toxoplasms were readily isolated from the brain of all birds a month after i/p infection.

Markov, A. A. & Abramov, I. V. (1961). **[The widespread application of effective methods for the control of protozoal diseases.]**—Veterinariya, Moscow No. 3 pp. 12-15. [In Russian.] **2903**

The authors stated that each year during the past six years in the Soviet Union, between 128 and 198 thousand cattle became infected with *Anaplasma, Babesia* and *Theileria annulata* and one in ten died. Systematic destruction of *Boophilus calcaratus* and *Rhipicephalus bursa* in Georgia and Krasnodar territory, and *Hyalomma* species in various regions, reduced the incidence. Bovine trichomoniasis remained a problem and instructions for the control of the disease were not always carried out efficiently.

Anaplasmosis in sheep and cattle was recorded for the first time in parts of

Belorussia, Azerbaijan, Uzbekistan, Dagestan and the Smolensk region. In most districts there were few acute cases and mortality was low. Treatment was discussed.—R.M.

See also absts. **3031** (U.N. report on animal diseases in Saudi Arabia); **3114** (report, Bechuanaland); **3116** (book, parasitology).

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

Mowat, G. N. (1961). **Multiplication in vivo of modified foot-and-mouth disease virus.**—Res. vet. Sci. **2**, 153-160. [Author's summary.] **2904**

Serial passage in the skeletal muscle of young calves of a mouse-adapted strain of the virus of foot-and-mouth disease was shown to be accompanied by multiplication of the virus. Using a marker dye, tissue from the site of inoculation was recovered and the virus content estimated. The increase in virus varied in different animals, but in one calf was at least a million-fold.

There was no increase in pathogenicity of the strain when inoculated into a group of 6 calves after 9 calf passages. Neutralizing antibody appeared in the sera of these calves in high titre within one week of inoculation.

Martin, W. B. & Chapman, W. G. (1961). **The tissue culture colour test for assaying the virus and neutralizing antibody of foot-and-mouth disease and its application to the measurement of immunity in cattle.**—Res. vet. Sci. **2**, 53-61. [Authors' summary modified.] **2905**

A tissue culture colour test, using pig kidney cells, is described for the titration of F. & M. disease virus and its antibody. Polyvinyl chloride plates and automatic syringes were used to enable large numbers of sera to be assayed rapidly for neutralizing antibodies.

Strains of the virus titrated with 4 cups at each tenfold dilution interval gave end-points with standard deviations of up to log. $\pm$ 0·22 and the sensitivity of the test compared favourably with that given by other methods. Uniform results were obtained when pools of cells from 4 different kidneys were used.

The neutralization line was rectilinear and had a slope of $-3{\cdot}2$. To each twofold serum dilution was added 100 TCD_{50} of virus. Interaction was allowed to proceed in the cups for 90 min. at 22–24°C.

Serum antibody levels in vaccinated cattle gave good correlation with the resistance shown by these animals when challenged.

Popescu, A., Tican, V. & Popescu, L. (1961). Cercetări electroforetice asupra seroproteinelor, în cursul hiperimunizării antiaftoase a bovinelor. **[Electrophoretic study of serum protein values in cattle, hyperimmunized against foot and mouth disease.]**—Lucr. Inst. Pasteur Bucureşti **5**, 59-67. [In Roumanian. Summaries in French, German and Russian.] **2906**

Total serum protein in cattle hyperimmunized against F. & M. disease fell from 8·04 to 7·62 g./100 ml. There was a certain increase in alpha-globulin, but variation in beta- and gamma-globulins was slight and insignificant. C.f. titres remained unchanged. A relationship between the gamma-globulin level and immunity was not established.—E.G.

Tomescu, V., Surdan, C., Popa, M. & Dohotaru, V. (1961). Comportarea tulpinii de virus aftos O_2 izolată din ţară în producţia de vaccin. **[Behaviour of the Roumanian foot and mouth disease strain O_2 in vaccine production.]**—Lucr. Inst. Pasteur Bucureşti **5**, 35-48. [In Roumanian. Summaries in French, German and Russian.] **2907**

Cattle immunized with 0·24 g. of vaccine made from a field strain of type O_2 foot and mouth disease virus resisted challenge six months later. Vaccines prepared from field strains were stated to be generally superior to those from laboratory strains.—E.G.

Popescu, A. & Tican, V. (1961). Virusul febrei aftoase în culturi de ţesuturi. I. Acţiunea citopatogenă a tulpinii indigene O_2 in culturi cellulare de cortex renal bovin. **[Cultivation of foot and mouth disease virus in tissue culture. I. Cytopathogenicity of Type O_2 in bovine renal cortex cells.]** — Lucr. Inst. Pasteur Bucureşti **5**, 69-79. [In Roumanian. Summaries in French, German and Russian.] **2908**

Monolayer cultures of epithelial cells of ox renal cortex were infected with F. & M. disease virus type O_2. At first there was no cytopathic effect; after the fourth passage, contraction of cells and structural changes in nuclei, such as karyorhexis and chromatolysis, were observed. After 15 passages in cattle, cytopathogenicity for ox embryonic kidney cell culture was moderate. Specificity of cellular degeneration was confirmed by serum neutralization tests.—E.G.

Cox, B. F., Cottral, G. E. & Baldwin, D. E. (1961). **Further studies on the survival of foot-and-mouth disease virus in meat.** — Amer. J. vet. Res. **22,** 224-226. [Authors' summary modified.] **2909**

Infective virus was demonstrated in (1) a prescapular lymph node removed surgically from a steer before clinical signs of disease appeared; (2) lymph nodes, but not in muscle samples or bone marrow, from an animal that had been slaughtered 5 days after regression of disease signs; (3) haemolymph nodes from both freshly killed and ripened carcasses; (4) bone marrow from ribs and vertebrae of an infected carcass that had been stored 194 days at 1°C., but not in lymph nodes stored in contact with ripened and salted meat in wooden barrels under the same conditions.

Pigs developed F. & M. disease when fed infected bone marrow mixed with bone fragments but not when the same bone marrow was fed alone.

Reczko, E. (1961). Elektronenmikroskopische Untersuchungen am Virus der Stomatitis vesicularis. **[Electron microscopy of the virus of vesicular stomatitis.]**—Arch. ges. Virusforsch. **10,** 588-605. [English summary modified.] **2910**

R. examined preparations of chorioallantoic membranes of chick embryos infected with vesicular stomatitis virus of the Indiana type.

After inoculation into the allantoic cavity spherical and rod-shaped particles, presumably belonging to the virus system of vesicular stomatitis, were demonstrable. They appeared first in the cells and intracellular spaces of the chorion layer.

Granular areas bordering the mesoderm were observed in cells of the chorionic and allantoic layers. These areas, which are separated from the remaining cytoplasm by a membrane, contain embedded virus particles. Presumably these areas represent the centres of virus development.

At a later stage, when the internal structure of the cells of the allantoic layer is destroyed, leaving the cell wall intact, the virus particles are observed also at the surface of entodermal cells facing the allantoic cavity.

The rod-shaped particles, demonstrated with the aid of phosphotungstic acid, each had a rounded and a square end. Single rods containing one inclusion were observed. Most of the spherical particles had tail-like appendages.

Wachendörfer, G. (1961). Die Laboratoriumsdiagnose der Tollwut mit Hilfe der Färbemethoden nach Lentz und Paarmann und des Mäuseversuches. **[Laboratory diagnosis of rabies by staining methods and by a mouse test.]** — Dtsch. tierärztl. Wschr. **68,** 261-263. **2911**

During 1953–60, rabies was diagnosed microscopically in 828 of 2,268 c.n.s. samples either by methylene blue-eosin (Lentz, 1907), or rhodamine B staining (Paarmann, 1954), or mouse inoculation. About 10% of positive samples were from domestic, 90% from free-living animals. Rabies was diagnosed by the mouse test in 282 of 289 microscopically positive samples and in 100 of 1,327 microscopically negative samples. Rhodamine B staining was suitable for use with decomposing material and therefore superior to the methylene blue-eosin method. It was sometimes difficult to distinguish Negri bodies stained with rhodamine from non-specific inclusions, particularly in deer and cats.—E.G.

McQueen, J. L., Lewis, A. L. & Schneider, N. J. (1960). **Rabies diagnosed by fluorescent antibody. I. Its evaluation in a public health laboratory.**—Amer. J. publ. Hlth **50,** 1743-1752. **2912**

Negri bodies were demonstrated in 66 of 825 samples of brain material from dogs, cats and other domestic and free-living mammals. By the fluorescent antibody technique, however, confirmed by mouse inoculation, rabies was diagnosed in 70. Crude globulin solutions prepared from hyperimmune horse serum served as antibodies, and fluorescein isothiocyanate as labelling stain. Details were given of processing of specimens, staining of smears and reading of results. The value of this method in routine diagnosis was discussed.—E.G.

Kauker, E. (1961). Beitrag zur Frage der Tollwutheilung beim Rind. **[Spontaneous recovery after suspected rabies in a heifer.]** —Dtsch. tierärztl. Wschr. **68,** 258-261. [Summary in English.] **2913**

A heifer, in an enclosure with two others which developed rabies, verified by the demonstration of Negri bodies, remained healthy, except for temporary sensory dulness and itching. Shortly before slaughter, nearly four months later, saliva, urine and faeces were examined and found to be free from virus, but rabies antibodies were demonstrated in the serum. P.M., neither Negri bodies nor lesions suggesting virus activity were present in the

c.n.s. It was concluded that the heifer had spontaneously recovered and become immune. —E.G.

Soave, O. A., Johnson, H. N. & Nakamura, K. (1961). **Reactivation of rabies virus infection with adrenocorticotropic hormones.**—Science **133,** 1360-1361. [Authors' summary modified.] **2914**

A g.pig inoculated i/m with rabies street virus survived for 5 months, but developed paralysis in the inoculated limb and died of rabies after treatment with adrenocorticotrophic hormone.

Fernandes, M. V. & Pomerat, C. M. (1961). **Cytopathogenic effects of rabies virus on nervous tissue in vitro.**—Z. Zellforsch. **53,** 431-437. [In English.] **2915**

Fixed rabies virus multiplied in cultures of nerve tissue and induced the formation of Negri-like, intra-cytoplasmic inclusion bodies in neurones. The incubation period remained constant, but cellular degeneration of glial and mesenchymal elements increased with the number of passages.—E.G.

Appleyard, G. (1961). **An immunizing antigen from rabbit-pox and vaccinia viruses.** —Nature, Lond. **190,** 465-466. **2916**

A virus-free immunizing antigen was extracted from tissues infected with rabbit-pox or vaccinia viruses, which when injected into rabbits resulted in the formation of sera with a neutralizing antibody titre against vaccinia comparable with that in animals convalescent from rabbit-pox infection.

—E.V.L.

Polley, J. R. (1961). **Preparation of non-infective soluble antigens with gamma radiation.** —Canad. J. Microbiol. **7,** 135-139. [Author's abst. modified.] **2917**

The use of gamma radiation from cobalt-60 for the preparation of non-infective diagnostic antigens for influenza A, influenza B, mumps, smallpox, and herpes simplex was investigated. It was possible to destroy the infectivity while retaining most of the complement-fixing activity of all these antigens. The degree of purity of the antigen had no apparent effect on the rate of inactivation, as is the case when formaldehyde is used. The degree of inactivation depended on the total amount of radiation applied and not on the dose rate.

Kokernot, R. H., Smithburn, K. C. & Kluge, E. (1961). **Neutralizing antibodies against arthropod-borne viruses in the sera of domestic quadrupeds ranging in Tongaland, Union of South Africa.**—Ann. trop. Med. Parasit. **55,** 73-85. [Authors' summary modified.] **2918**

The results are reported of protection tests with 11 viruses against sera from cattle, goats and sheep in mountain, riverine-pan and coastal-plain zones in Tongaland.

The incidence of protective sera was highest for Wesselsbron, Middelburg, Bunyamwera, Rift Valley fever and Pongola viruses.

The results with three viruses were analysed with respect to the age of the donor. The incidence of protective sera against Middelburg and Wesselsbron viruses was higher than might have been expected in the youngest animals, which had only two years' exposure.

Protection tests were also done with a limited number of sera from donkeys and dogs from the Lake Simbu region.

The results of the tests with sera from domestic quadrupeds are compared with those of similar tests with sera from human beings residing in Tongaland.

The specificity of neutralization with sera from domestic animals is discussed. Reasons are presented which indicate that the capacity of certain sera collected in Tongaland to protect against a specific virus is more likely than not to be due to previous infection with that agent or with some antigenically related virus.

The indications for susceptibility studies with arthropod-borne viruses are discussed.

Möhlmann, H. & Maas, A. (1960). Wertigkeitsprüfung des Borna-Trockenimpfstoffes "Dessau" bei Pferden unter den Verhältnissen der Praxis. **[Evaluation of a dried vaccine against Borna disease in horses.]**—Arch. exp. VetMed. **14,** 1267-1280. **2919**

In a field experiment in a Borna disease district, about 2,300 horses were vaccinated with 0·5 g. of a vaccine prepared from dried brain tissue of infected rabbits. About 2,500 horses were left unvaccinated as controls. Twenty of the vaccinated and 29 of the control horses developed the disease. In view of these results there were doubts on the justification of further experiments with higher doses.

—E.G.

Radomiński, W. (1961). Badania doświadczalne nad niedokrwistością zakaźną koni. **[Experimental studies in equine infectious anaemia.]** —Med. Wet., Warszawa **17,** 4-13. [In Polish.

Summaries in English, French, German and Russian.] **2920**

R. studied 11 horses infected experimentally with the Pulawy X strain and 4 naturally infected horses. A fall in the number of r.b.c. and in the Hb level was not always demonstrable in the experimental cases and never in the early stages of the disease. Increased sedimentation rate was the most constant and characteristic sign. During the incubation period there was leucopenia, and in the early stages of the clinical disease lymphopenia and neutrophilia were recorded, followed by lymphocytosis and neutropenia. R. regards histological examination of liver biopsy material as a reliable diagnostic method. The atropine and adrenaline provocation methods carried out at intervals of 7–8 hours gave positive results in 11 out of 12 cases.

—M. GITTER.

Konno, S. (1961). **Morphological studies on the spleen punctate in equine infectious anemia.**—Jap. J. vet. Res. **8**, Suppl. No. 1 pp. 46. [In English.] **2921**

The cytological findings were described in spleen biopsy specimens from normal horses, horses producing immune serum, and 16 horses naturally and 9 experimentally infected with equine infectious anaemia. In the infected group, long and short term observations were made on spleen, liver, bone marrow and peripheral blood and compared with P.M. findings. In the naturally infected horses, lambda (λ) cell reaction was present in spleen smears and tissue sections in subacute but not in chronic or relapsing cases. In experimental cases, the outstanding characteristic changes were λ cell reaction in the initial stage, formation of nodules in the liver in the chronic stage, and parenchymal degeneration and activation of the cells of the reticulo-endothelial system throughout the body in the relapsing stage. Lambda cells disappeared from spleen smears as the disease became chronic and did not recur even in the relapsing stage.—A. ACKROYD.

Reid, N. R. (1961). **African horse sickness. The 1959-60 epizootic of African horse sickness in the Near East region and India, and a note on technical assistance provided by the Food and Agriculture Organization of the United Nations.**—Brit. vet. J. **117**, 137-142. **2922**

East of Suez, African horse sickness has seldom been recorded. In the summer of 1959, it occurred in the Persian Gulf region of Iran and spread north-east and north-west into Afghanistan and Pakistan. In 1960 it spread west into Iraq, Turkey, northern Syria, Cyprus, the Lebanon and Jordan, and east across the Thar desert into India. Losses in horses and to a lesser extent in mules were severe and dislocated farming operations. Through FAO and OIE countries were persuaded to co-operate in preventing the disease from spreading to Europe, the U.S.S.R. and the Far East.

In the early stages, control was limited to the use of quarantine and in certain countries, notably Pakistan, destruction of clinical cases and hygienic measures. Although the strain of virus causing this Asian epidemic is not identical with any of the South African strains, the polyvalent Onderstepoort attenuated vaccine afforded protection and 100,000 doses were made available. A training centre for diagnosis and vaccine production was organized in Iran whilst formolized inactivated spleen and lymph node vaccine was prepared in Turkey.

On August 1960, FAO convened a meeting and money, experts, equipment and mice for use in the preparation of vaccine were supplied so that by April 1961, eight laboratories in the region should be capable of producing 500,000 doses of vaccine a month. With the onset of winter, the disease subsided in all countries except India.

—A. ACKROYD.

Moulton, W. M. & Stone, S. S. (1961). **A procedure for detecting complement-fixing antibody to rinderpest virus in heat-inactivated bovine serum.**—Res. vet. Sci. **2**, 161-166. [Authors' summary modified.] **2923**

Complement-fixing antibody to rinderpest virus was demonstrated in heat-inactivated cattle sera, using an extract of rinderpest-infected bovine lymph nodes as antigen, increasing concentrations of g.pig complement, and overnight fixation. Specific complement-fixing antibody was demonstrable from 5 days after fever peak or 10 days after inoculation for at least 50 days. Sera were obtained from cattle inoculated with lapinized Nakamura III, Kabete attenuated goat, and tissue culture attenuated Kabete O and Pendik strains of the virus.

Cattle having complement-fixing antibody resisted challenge with virulent virus.

MacLeod, A. J. & Kishi, S. (1961). **Some factors influencing the propagation of rinderpest virus in embryonated eggs.**—J. comp.

Path. **71,** 140-145. [Authors' conclusions modified.] **2924**

For the propagation of the LA strain of rinderpest virus in eggs, 10-day old embryos were best. The use of 12-day or older embryos is not recommended.

The breed of hen providing the eggs may influence the growth of the virus, but further work is necessary before this breed factor can be assessed.

Plowright, W. & Ferris, R. D. (1961). **The preparation of bovine thyroid monolayers for use in virological investigations.**—Res. vet. Sci. **2,** 149-152. [Authors' summary modified.] **2925**

A technique for the production of monolayer cultures from calf thyroids is described. Trypsin-dispersed cell suspensions were standardized on a count of cell-aggregates, individual calf thyroids yielding a mean 175 ml. of suspension (range 100–340 ml.) containing 50–75,000 aggregates per ml.

Thyroid cultures were developed for the isolation and titration of the virus of bovine malignant catarrh. Their susceptibility to some other viruses was investigated briefly.

Byrne, R. J., Abinanti, F. R. & Huebner, R. J. (1961). **Experimental immunization of cattle with myxovirus parainfluenza 3 vaccines.** — Cornell Vet. **51,** 211-219. [Authors' summary modified.] **2926**

Calves were immunized with formalin-inactivated human and bovine parainfluenza 3 virus vaccines and subsequently challenged with aerosols of the bovine virus. Whilst no obvious signs of disease were produced by the virus challenge, certain of the animals did excrete the virus in their nasal secretions. The only calves to excrete the virus, however, were those having little or no evidence of pre-existing HI antibody.

Abinanti, F. R., Chanock, R. M., Cook, M. K., Wong, D. & Warfield, M. (1961). **Relationship of human and bovine strains of myxovirus para-influenza 3.**—Proc. Soc. exp. Biol., N.Y. **106,** 466-469. [Authors' summary modified.] **2927**

Guinea-pigs infected intranasally with human (HA-1) and bovine (SF-4) strains of para-influenza 3 virus produced fourfold or greater HI, neutralizing and c.f. antibodies to the homologous than to the heterologous strain. Children and cattle showed similar species-linked responses after infection with para-influenza 3 viruses. Human and bovine strains of the virus from various States of the U.S.A. and from foreign countries and isolated in different years reacted in the same manner as HA-1 and SF-4 prototype strains.

Greig, A. S. (1961). **The detection of antibody to infectious bovine rhinotracheitis virus in Ontario cattle.**—Canad. J. comp. Med. **25,** 31-34. [Author's summary.] **2928**

Serum-virus neutralization trials in tissue culture have demonstrated that 8·13% of the sera tested from Ontario cattle had antibodies to infectious bovine rhinotracheitis virus. These positive sera were obtained from 18·9% of the herds tested.

Quin, A. H. (1961). **Conjunctivitis caused by IBR virus.**—Vet. Med. **56,** 192-193. [Abst. from author's summary.] **2929**

In an outbreak of conjunctivitis in a consignment of feeder calves, the virus of infectious bovine rhinotracheitis was isolated from eye swabs of affected calves, although there were no other symptoms.

Kniazeff, A. J. & Pritchard, W. R. (1961). **Antigenic relationships in the bovine viral diarrhea-mucosal disease complex.** — Proc. 64th Ann. Meet. U.S. Livestock Sanit. Ass., Charleston, 1960 pp. 344-350. [Authors' summary modified.] **2930**

Neutralization of a cytopathic bovine viral diarrhoea virus, strain Oregon C24V with antisera to several bovine viral diarrhoea-mucosal disease agents revealed that these agents form an immunologically related group.

Neutralization tests did not show any relationship between this strain of the viral diarrhoea virus and the following: blue-tongue, swine fever, infectious bovine rhinotracheitis, infectious ulcerative stomatitis, mycotic stomatitis, sporadic bovine encephalitis or winter dysentery.

Gillespie, J. H., Coggins, L., Thompson, J. & Baker, J. A. (1961). **Comparison by neutralization tests of strains of virus isolated from virus diarrhea and mucosal disease.**—Cornell Vet. **51,** 155-159. [Authors' summary modified.] **2931**

Five strains of virus diarrhoea virus and one designated mucosal disease virus showed antigenic relationship when compared by the neutralization test. These results suggest that comparisons should be made by serological tests before new and different disease entities are postulated on the basis of clinical and pathological findings.

Pillai, C. P. (1961). **Suspected cases of bluetongue in sheep.**—Sudan J. vet. Sci. anim. Husb. **2**, 47-50. [In English. Abst. from author's summary.] **2932**

An account of a suspected outbreak of bluetongue in sheep, with details of the clinical signs and of unsuccessful attempts to transmit the disease experimentally and to identify the virus.

Moulton, J. E. (1961). **Pathology of bluetongue of sheep, in California.**—J. Amer. vet. med. Ass. **138**, 493-498. [Author's summary modified.] **2933**

Gross and microscopic lesions in 56 California sheep infected with bluetongue are described. The most consistent were generalized oedema, hyperaemia, and haemorrhage; erosions in the oral region; pulmonary and lymph node hyperaemia and oedema; and necrosis of skeletal and cardiac muscles.

MacKay, J. M. K. & Smith, W. (1961). **A case of scrapie in an uninoculated goat—a natural occurrence or a contact infection?**—Vet. Rec. **73**, 394-395 & 396. [Authors' summary modified.] **2934**

Scrapie occurred in an uninoculated adult goat. Diagnosis was confirmed by histological examination.

Pattison, I. H. & Millson, G. C. (1961). **I. Scrapie produced experimentally in goats with special reference to the clinical syndrome. II. Experimental transmission of scrapie to goats and sheep by the oral route.**—J. comp. Path. **71**, 101-108 & 171-176. [Authors' conclusions modified.] **2935**

I. Further clinical observations on goats with experimentally-produced scrapie are recorded, and comment is made on two clinical syndromes—nervous and scratching—that appear to be reproducible by intracerebral inoculation. It is suggested that certain "strains" of the scrapie agent produce the nervous and others the scratching syndrome.

Rapid freezing and thawing of a saline suspension of scrapie goat brain did not adversely affect the infectivity.

An ether extract of scrapie goat brain was shown by intracerebral inoculation of goats to contain the scrapie-producing agent, while an acetone extract of the same brain failed to produce the disease when inoculated intracerebrally into goats that have been kept under observation for two years.

II. Scrapie occurred in two goats and in seven of 50 sheep dosed orally with 100 ml. of a suspension of scrapie goat brain.

During 29 months, scrapie did not occur in goats inoculated intracerebrally with unfiltered milk or with filtered saliva, urine or faeces from a scrapie-affected goat. These findings do not necessarily mean that the scrapie agent is absent from these secretions and excretions and further experiments are needed.

Infection by mouth might explain the observation of earlier authors that, without breeding contact, scrapie may sometimes spread from sheep to sheep at pasture.

Chandler, R. L. (1961). **Encephalopathy in mice produced by inoculation with scrapie brain material.** — Lancet, June 24th, 1378-1379. [Author's discussion and summary.] **2936**

A degenerative disorder of the central nervous system was observed in mice inoculated with scrapie brain material. The disease occurred in one of three breeds of mice inoculated when weaned, and when one type of scrapie brain material was used. The fact that the disease was observed in only one of the three mouse breeds is noteworthy because Gordon found a wide variation in susceptibility to scrapie among breeds of sheep. Other points of similarity to scrapie are the long incubation period, the clinical symptoms, and the histological lesions.

Although the relation of this encephalopathy to scrapie requires further elucidation, these preliminary results are reported because they may be of interest to those studying degenerative conditions of the nervous system.

Bran, L., Mihăită, S., Bercan, A. & Albu, T. (1961). Valoarea imunizantă a virusului pestos porcin lapinizat, inoculat singur sau în asociaţie cu serul antipestos sub diferite forme. **[Immunogenic value of lapinized swine fever virus, alone or in various combinations with serum.]**—Lucr. Inst. Pasteur Bucureşti **5**, 105-118. [In Roumanian. Summaries in French, German and Russian.] **2937**

Lapinized swine fever virus immunized up to 94·4% of pigs but about 30% developed post-vaccination reactions. When given simultaneously with swine fever serum it protected 79–87·1%. Satisfactory immunity in 92·5% of vaccinated pigs was achieved by simultaneous virus-serum vaccination, followed 34 days later by lapinized virus alone. Post-vaccination reactions were minimal. Lapinized virus, when given 5–14 days after serum, protected only about 50%

of vaccinated pigs. In all cases immunity lasted at least 10 months. About 30–35% of susceptible pigs, housed with vaccinated ones, became immune through contact.—E.G.

Torrey, J. P., Zinober, M. R. & Amtower, W. C. (1961). **Studies on modified virus vaccines for hog cholera. II. Reactivation by serial passage.**—Proc. 64th Ann. Meet. U.S. Livestock Sanit. Ass., Charleston 1960 pp. 298-308. [Authors' summary modified.] **2938**

Serial passages were made of four vaccines of rabbit origin, one vaccine of porcine origin, and one field virus. The first few passages of the rabbit vaccine produced immunity in the injected pigs and in the contact pigs with no visible reactions but all seemed to regain some virulence as evidenced by reactions in the test pigs. One vaccine did not kill any of the test pigs. The other three killed pigs in the higher passages.

The porcine vaccine produced reactions and immunity in the first passages, and death in the later passages.

A field virus isolated from sick pigs seemed to be similar to vaccine virus.

All of the viruses passed from the injected pigs to the contact pigs.

No evidence of variant characteristics was observed in four of the viruses. One virus, when used with a test serum, caused a reaction in the pigs. They recovered and were immune.

Szurman, J. (1961). Użycie plazmy mleka jako płynu utrzymującego w hodowli wirusa choroby cieszyńskiej na komórkach nerkowych świni. **[Use of whey in pig kidney cell culture of Teschen disease virus.]**—Med. Wet., Warszawa **17**, 24-25. [In Polish.] **2939**

Whey was a useful nutrient for pig kidney cell cultures of Teschen disease virus because of its freedom from non-specific inhibitory factors present in serum.

—M. Gitter.

Richards, W. P. C. & Savan, M. (1961). **A viral encephalomyelitis of pigs. Further studies on the transmissibility of the disease in Ontario.**—Cornell Vet. **51**, 235-244. [Abst. from authors' summary.] **2940**

Piglets reared without colostrum were used as test animals for transmission of the disease; of 28 piglets inoculated by various routes with bacteriologically sterile suspensions of brain tissue, 16 developed the disease. In preliminary serological tests, representative sera from field cases of the disease neutralized the virus of Talfan disease.

Gainer, J. H. & Murchison, T. E. (1961). **Encephalomyocarditis virus infection of swine.** — Vet. Med. **56**, 173-175. [Authors' summary modified.] **2941**

The encephalomyocarditis virus was isolated from pigs on 2 farms in Florida. The disease had not previously been recorded from North America. The characteristic gross lesions seen in the acute disease are discrete, white, focal discolorations of the myocardium of the right ventricle. This lesion, microscopically, is necrosis with calcification and monocytic infiltration.

Young, G. A., Underdahl, N. R. & Kelley, G. W. (1961). **Leucinamidase activity associated with influenza-parasite complexes in pigs.**—Proc. Soc. exp. Biol., N.Y. **106**, 592-594. [Authors' summary modified.] **2942**

A moderate increase in serum leucinamidase activity occurred in colostrum-deprived pathogen-free pigs experimentally infected with swine influenza virus. Activity also increased during migration of ascaris larvae through the liver and again when the larvae reached the lungs. Greatest leucinamidase activity was stimulated when influenza virus was "provoked" from its latent lungworm state by migrating ascaris larvae.

Barber, T. L., Moulton, W. M. & Stone, S. S. (1961). **The identification and typing of vesicular exanthema by complement fixation and agar diffusion tests.** — Proc. 64th Ann. Meet. U.S. Livestock Sanit. Ass., Charleston, 1960 pp. 317-323. [Authors' summary modified.] **2943**

Vesicular exanthema-infected pig tissues and tissue cultures along with convalescent and hyperimmune pig sera were assayed by complement-fixation and agar diffusion tests.

The procomplementary activity of pig serum did not interfere with interpretations of results with the c.f. procedure described.

The rise and fall of c.f. antibody in convalescent pig serum was demonstrated.

Seven types of the virus were identified by c.f. using convalescent pig sera and infected tissue antigen. Comparable results were obtained using agar diffusion with tissue culture antigens.

Two hyperimmune pig sera provided heterotypic antibody sources that enabled screening of the existing types of vesicular exanthema from vesicular stomatitis and

F. & M. disease by c.f. and agar diffusion tests.

Vishnyakov, S. I. & Grosheva, G. A. (1961). **[Infectious gastro-enterocolitis in pigs.]** — Veterinariya, Moscow No. 3 pp. 37-40. [In Russian.] **2944**

An infectious gastro-enteritis, with heavy losses, has occurred in the Kursk region since 1957. The principal virus diseases of pigs were excluded as the cause, and bacteriological examinations failed to reveal pathogenic bacteria. It was particularly severe among pigs less than 10 days old, half of which died, while among older unweaned piglets 15–20% died. The incubation period was 1–3 days in piglets, 3–6 days in adults. Lesions were swelling and haemorrhage in mesenteric lymph nodes and catarrhal gastro-enteritis (sometimes haemorrhagic) with degenerative changes in various organs and often pneumonia.

Suspensions in saline of stomach, intestine and other organs, passed through a Seitz filter and free from bacteria, were inoculated into the nose and mouth of 6 piglets aged 2 days (1 ml. of 1 : 100 suspension). They developed the disease after 3 days, and three pigs died 4–7 days after infection; the others recovered. Filtered material from another outbreak was inoculated into two pigs aged 2 months and three pigs aged 4 days: the older pigs developed gastro-enteritis and recovered but two of the young pigs died. It was concluded that the disease was caused by a virus. Attempts were made to prevent the disease by injection of citrated blood, collected from pigs 9–12 days after recovery, in 2–3 ml. doses into 52 new-born piglets. Only six of them died, compared with 120 of the 212 untreated piglets. Hygienic measures for control of the disease were discussed.—R.M.

Mitchell, D., Corner, A. H., Bannister, G. L. & Greig, A. S. (1961). **Studies on pathogenic porcine enteroviruses. I. Preliminary investigations.**—Canad. J. comp. Med. **25**, 85-93. [Authors' summary modified.] **2945**

The clinical and pathological findings in a disease of unweaned pigs in five herds in Eastern Ontario are described. The disease occurred in 14 litters from 4 to 15 days of age and was characterized by sudden onset, shivering, ataxia, rapid emaciation and high mortality. Lesions of a viral polio-encephalomyelitis were seen in 14 of 29 affected piglets examined. Limited virus transmission studies were inconclusive but it appears that the condition can be transmitted by intracranial as well as intranasal-oral inoculation. Further studies and the isolation of cytopathic agents will be described in later papers.

Nicol, L., Girard, O., Corvazier, R., Cheyroux, M., Reculard, P. & Sizaret, P. (1961). Vaccins et sérums anti-virus de Carré. I.—Contrôle des vaccins et sérums. II.—La maladie de Carré au sein du "complexe maladie" des chiens. **[Canine distemper. I. Control of vaccines and sera. II. Position of distemper among the virus diseases of dogs.]** —Bull. Acad. vét. Fr. **34**, 23-32. Discussion: pp. 32-36. **2946**

I. Methods of standardizing vaccines and sera against canine distemper in eggs and ferrets were described.

II. A virus or group of viruses distinct from distemper virus causes rhino-tonsillitis, pneumonia and encephalomyelitis in dogs. Since attenuated strains of rhino-tonsillitis, pneumonia and canine hepatitis viruses are unstable and liable to recover their pathogenicity in dogs, killed vaccines are recommended for these diseases. Hyper-immune sera can be prepared in horses.
—M.G.G.

Popescu, A. (1961). Virusul maladiei lui Rubarth in culturi de ţesuturi. I. Acţiunea citopatogenă a virusului in culturi cellulare de cortex renal canin. **[Cultivation of canine hepatitis virus in tissue culture. I. Cytopathogenicity in dog renal cortex cells.]** — Lucr. Inst. Pasteur Bucureşti **5**, 81-90. [In Roumanian. Summaries in French, German and Russian.] **2947**

Cytopathogenicity of canine hepatitis virus was studied in monolayer trypsinized dog renal cortex tissue culture, using a lactalbumin hydrolysate medium. There were nuclear inclusions, degenerative lesions in nuclei and granulation in the cytoplasm.—E.G.

Keeble, S. A., Baker, L. A. & Howell, D. G. (1961). **Immunisation against canine virus hepatitis using an inactivated vaccine.**—Vet. Rec. **73**, 286-289. [Authors' summary modified.] **2948**

The production, testing and indications for use of an inactivated canine virus hepatitis vaccine are described. The serological response to inactivated vaccine with or without simultaneous distemper vaccination was satisfactory. There was no cross interference by either antigen.

Hepatitis antibody levels reached a maximum at 4 weeks and declined to low values 6 months after vaccination. At this time challenge with live virulent virus did not result in pyrexia or illness, indicating a satisfactory degree of immunity in spite of lower antibody levels. After challenge high antibody levels were again produced, and a similar response was observed after a "booster" inoculation with inactivated vaccine. The use of this type of vaccine is discussed, in relation particularly to simultaneous vaccination with avianized distemper vaccine.

Parker, R. L., Cabasso, V. J., Dean, D. J. & Cheatum, E. L. (1961). **Serologic evidence of certain virus infections in wild animals.** —J. Amer. vet. med. Ass. **138,** 437-440. [Authors' conclusions modified.] **2949**

Serological evidence of infection with canine distemper and infectious canine hepatitis was observed in foxes and raccoons but not in opossums. In foxes, these viruses are more likely to occur where the fox population is high. Low complement-fixing titres were found against Eastern equine, Western equine and St. Louis encephalitis virus antigens.

Huck, R. A., Shand, A., Allsop, P. J. & Paterson, A. B. (1961). **Malignant catarrh of deer.**—Vet. Rec. **73.** 457-464 & 465. [Authors' summary modified] **2950**

A fatal disease resembling in some respects bovine malignant catarrh occurred among Père David's deer *(Elaphurus davidianus)* at Whipsnade Zoological Park and was transmitted to red deer, to calves and to rabbits. The clinical symptoms, post-mortem and histological findings and experimental inoculations are described. There is no information concerning the possible source of infection.

Karstad, L., Winter, A. & Trainer, D. O. (1961). **Pathology of epizootic hemorrhagic disease of dear.**—Amer. J. vet. Res. **22,** 227-235. [Authors' summary modified.] **2951**

Six deer were infected experimentally with the virus of epizootic haemorrhagic disease of deer to study the lesions and their pathogenesis.

The prolonged blood coagulation time was related to prothrombin deficiency. This derangement of blood clotting, plus degenerative changes in blood vessel walls, resulted in multiple haemorrhages. Most vessels which were not ruptured appeared to be greatly dilated, explaining the shock seen just before death.

Multiple haemorrhages produced a variety of degenerative changes in the associated tissues and organs; at least some of these were considered to be the result of an interrupted blood supply.

The characteristic clinical picture was a sharp rise in body temperature at about 5 days after inoculation, with anorexia and weakness. This was followed by gradual depression of body temperature associated with a shock-like condition, until death occurred 2 to 6 days later.

Scholtissek, C. & Rott, R. (1961). Untersuchungen über die Vermehrung des Virus der klassischen Geflügelpest. **[Multiplication of fowl plague virus in chick-embryo cells.]** —Z. Naturf. **16b,** 109-115. **2952**

The Rostock strain of virus was used. Ribonucleic acid (RNA) was determined by digesting infected cells with pancreatic ribonuclease. This converted RNA to oligonucleotides, identified by chromatography. It was also traced by labelling the virus with P^{32} in the form of orthophosphate. RNA was not detected until two hours after infection of a monolayer of chick-embryo cells; almost all was bound to soluble antigen.—R.M.

Waterson, A. P., Rott, R. & Schäfer, W. (1961). **The structure of fowl plague virus and virus N.**—Z. Naturf. **16b,** 154-156. [In English.] **2953**

Fowl plague virus (FPV) and virus N [*V.B.* **30,** 2566] were examined under the electron microscope. The particles of FPV were similar to those of influenza A virus. Virus N was more pleomorphic, but the products of ether splitting were very similar to those of FPV [22 photomicrographs].

—R.M.

Wheelock, E. F. & Tamm, I. (1961). **Enumeration of cell-infecting particles of Newcastle disease virus by the fluorescent antibody technique.**—J. exp. Med. **113,** 301-316. [Authors' summary modified.] **2954**

A procedure for determination of the concentration of infective Newcastle disease virus (NDV) is based on the enumeration of singly infected and distributed HeLa cells which are visualized by staining with fluorescent antibody. Infective virus assayed by the fluorescent cell-counting procedure is expressed in terms of cell-infecting units.

Finkelstein, R. A. (1961). **Alteration of susceptibility of embryonated eggs to Newcastle disease virus by Escherichia coli and endotoxin.** — Proc. Soc. exp. Biol. N. Y. **106,** 481-484. [Author's summary.] **2955**

Phases of enhanced resistance and susceptibility to Newcastle disease virus were induced in chick embryos by infection with *E. coli.* These effects were duplicated by treatment of embryos with *E. coli* endotoxin at appropriate times.

Squibb, R. L. (1961). **Avian disease virus and nutrition relationships. I. Effect of vitamin A on growth, symptoms, mortality and vitamin A reserves of White Leghorn chicks infected with Newcastle disease virus.**—Poult. Sci. **40,** 425-433. [Abst. from author's summary.] **2956**

Newcastle disease decreased feed and water intake and weight gains of White Leghorn chicks.

Vitamin A therapy had no effect on weight gains, water intake, feed efficiency, symptoms or mortality of chicks with adequate body reserves of the vitamin.

NDV infection in these chicks did not depress body reserves of vitamin A or prevent its absorption.

Bran, L., Suhaci, I & Popa, C. (1961). Cercetări comparative asupra tulpinilor lentogene de virus Newcastle B_1 şi F şi a metodelor practice de vaccinare a puilor. **[Comparison of attenuated Newcastle disease virus strains B_1 and F and methods of vaccination.]**—Lucr. Inst. Pasteur Bucureşti. **5,** 5-20. [In Roumanian. Summaries in French, German and Russian.] **2957**

Immunogenicity of B_1 vaccine was superior to that of Strain F, and aerosol vaccination was preferable to the conjunctival and drinking water method of application, particularly in large flocks. It conferred immunity to chicks, which lasted at least three months. The optimum time for vaccination was at the age of 10–14 days, when egg-transmitted immunity begins to fade, and for revaccination, 3–4 months later.—E.G.

Bader, J. P. & Morgan H. R. (1961). **Latent viral infection of cells in tissue culture. IX. Abortive infection with psittacosis virus.**—Proc. Soc. exp. Biol., N.Y. **106,** 311-313. [Authors' summary modified.] **2958**

L cells which are maintained for 2 or 3 days on phenylalanine- or isoleucine-deficient medium do not support the growth of psittacosis virus and a latent infection is established. Virus can be recovered from these cultures only after addition of a complete medium, but extension beyond 8 days of the interval between infection and addition of complete medium results in a permanent disappearance of infectious virus. L-cell cultures that have "recovered" from the infection are susceptible to re-infection with psittacosis virus.

Porterfield, J. S. (1961). **Israel turkey meningo-encephalitis virus.**—Vet. Rec. **73,** 392-393 & 394. [Author's summary.] **2959**

The turkey meningo-encephalomyelitis virus of Komarov and Kalmar (1960) has been shown to fall into the Group B of arthropod-borne viruses. Evidence is presented for considering this virus to be a new and distinct member of the group.

Sokol, F., Blaškovič, D. & Rosenberg, M. (1961). **Subunits of myxoviruses. I. Treatment of Newcastle disease, para-influenza 1 and mumps viruses by ether.**—Acta Virologica, Prague **5,** 65-77. [Authors' summary modified.] **2960**

Newcastle disease, para-influenza 1 and mumps viruses, under ether treatment, liberated haemagglutinating subunits in the same way as do influenza viruses. The highest yield of haemagglutinin was from Newcastle disease virus. Much less was released from para-influenza 1 and mumps viruses. Such subunit suspensions also contained subunits of a nucleoprotein nature, which are probably similar to the *g*-antigens of influenza viruses. All subunit suspensions contained predominantly roughly spherical particles of about 30 mμ diameter. Those of Newcastle disease and mumps viruses also had long filaments of about 30 mμ thickness.

Maurer, F. D. (1961). **Exotic diseases on the move.**—J. Amer. vet. med. Ass. **138,** 214-215. **2961**

Great losses have occurred in Spain from African swine fever, and in the Near East and south-eastern Asia from African horse-sickness. Primates exported from Africa in large numbers might introduce Rift Valley fever to the U.S.A. The U.S.A. should participate in the study and control of these highly destructive diseases. [It is also stated that great losses are occurring in Japan from bluetongue, but there is no confirmation from Japanese publications of this.]—M.G.G.

I. & II. Rice, C. E. (1961). **The use of complement-fixation tests in the study and diagnosis of viral diseases in man and animals. A review. Part VI. The enteroviruses. Part VII. The psittacosis-lymphogranuloma venereum group.**—Canad. J. comp. Med. **25,** 35-40 & 74-79. [Author's absts. modified.] **2962**

I. Complement-fixation methods have been of limited value in diagnosis of Coxsackie and ECHO viruses because of the wide antigenic relationships among the various types. To date very little use has been made of c.f. methods in investigations of the enteroviruses of domestic and wild animals, but such studies should be widely undertaken particularly with the specially-adapted c.f. methods recently developed for avian and bovine antisera.

II. All viruses of the psittacosis-lymphogranuloma group have common heat-stable group antigens which fix g.pig complement with the corresponding antibodies in the sera of man, g.pigs, cats, cattle, sheep, psittacine birds and pigeons. They also produce heat-labile, type specific antigens, which can be detected in c.f. tests with antisera from which the group antibodies have been removed by absorption.

For testing sera of chickens, turkeys and ducks for antibodies to viruses of the psittacosis group, indirect c.f. methods have been widely used in flock diagnosis and surveys. It is also possible to demonstrate antibodies in sera of turkeys with psittacosis by direct c.f. tests with detergent-extracted antigens or when unheated chicken serum is added to supply some "implementing" factor.

Brown, N. K. (1961). **Selective viral and rickettsial serum antibody absorption by a chromatographic column.**—J. Dairy Sci. **28,** 331-332. [Author's summary.] **2963**

Serum antibodies behave as cations at neutral pH and thus have low affinity for cellulose anion-exchange columns. Antigens of small size derived from adenovirus, influenza virus, and typhus rickettsiae, however, readily adsorbed to such columns. These adsorbed antigens specifically removed antibodies from antisera. This simple method permits antibody absorption by antigens ordinarily sedimented with difficulty.

See also absts. **3031** (U.N. report on animal diseases in Saudi Arabia); **3114** (report, Bechuanaland); **3115** (book, animal virology).

IMMUNITY

Patterson, R. (1961). **Use of I^{131}-labeled antigens in gel diffusion precipitate reactions.**—J. Lab. clin. Med. **57,** 657-660. [Author's summary modified.] **2964**

P. described the use of I^{131}-trace labelled antigens in gel diffusion precipitin reactions. With low concentrations of antigen and antibody, the immune aggregates in gel may not be grossly visible, yet they become evident by autoradiography of the gel medium when I^{131}-trace labelled antigens are used. This resulted in a hundredfold increase in sensitivity of the technique.

Rice, C. E. (1961). **Complement-fixation tests of multiple antigen-antibody systems. IV. The use of simple mathematical aids in preliminary evaluation of antiserum titres and in antigen adjustment.**—Canad. J. comp. Med. **25,** 46-50. [Author's summary.] **2965**

The effect that improper proportions of antigen components may conceivably have upon the complement-fixing activity of antisera containing two different kinds of antibody is illustrated through the use of simple mathematical models. These models have proved of practical value in evaluating the results of preliminary tests with mixed antigens and in making the required readjustment in the proportions of the respective antigen components.

Porterfield, I. D. & Petersen, W. E. (1961). **Antibody response of the bovine udder.** — Proc. 64th Ann. Meet. U.S. Livestock Sanit. Ass., Charleston, 1960 pp. 159-163. [Authors' summary modified.] **2966**

Intramammary infusions of an antigen during the dry period resulted in a higher antibody content in the colostrum than in the blood serum. Intramuscular and subcutaneous injections of the antigen during the dry period produced antibody in both colostrum and blood serum but not as much as did intramammary infusions during the dry period.

Antibodies appeared in the milk within two hours after lactating cows were infused with the antigen.

Milk antibody levels did not increase after intramuscular booster injections of the antigen, but did increase within 5–9 hours in cows given intramammary booster infusions of the antigen.

Antibody content of the milk and blood

serum remained high for 246–288 days after immunization during the dry period.

Glick, B. & Sadler, R. (1961). **The elimination of the bursa of Fabricius and reduction of antibody production in birds from eggs dipped in hormone solutions.**—Poult. Sci. **40,** 185-189. [Authors' summary modified.] **2967**

Hormones were introduced into fertile eggs by dipping the eggs into solutions containing testosterone propionate and diethylstilboestrol. Testosterone significantly reduced and, in some cases, eliminated the bursa of Fabricius. The bursa was also significantly reduced after eggs were dipped in a diethylstilboestrol solution. Both hormone solutions reduced spleen size. Antibody response to a polyvalent *Salmonella pullorum* antigen was markedly reduced in birds hatched from the testosterone propionate dipped eggs. A description of the treated birds was given.

Baker, J. A. & Robson, D. S. (1961). **Serological tests as indicators of immunity.**—Proc. 64th Ann. Meet. U.S. Livestock Sanit. Ass., Charleston, 1960 pp. 58-69. [Authors' summary modified.] **2968**

Standardized procedures for assurance that vaccines will immunize are an urgent need today. As new products are introduced, singly and in combination, especially those of the live virus type, it becomes imperative to establish efficacy ratings. Animal protection tests now in use do not permit vaccine evaluation without the use of larger numbers of animals, and this is impractical. Serological tests, based upon statistical design, appear to offer the solution if the serological test can be established as a reliable indicator of immunity.

Possible procedures for vaccine evaluation are outlined serologically and statistically and examples from distemper show that they may be capable of practical application.

Brent, R. L., Averich, E. & Drapiewski, V. A. (1961). **Production of congenital malformations using tissue antibodies. I. Kidney antisera.**—Proc. Soc. exp. Biol., N.Y. **106,** 523-526. [Authors' summary modified.] **2969**

Rabbit anti-rat kidney sera, in a prescribed dosage, injected i/v into rats on the 8th day of pregnancy, resulted in severe congenital malformation in all the foetuses. Larger doses caused complete foetal resorption. These antisera may produce teratogenesis by interfering with placental function.

Burnet, F. M. (1961). **Immunological recognition of self.**—Science **133,** 307-311. **2970**

The author discusses the possible means by which a vertebrate organism recognizes self from non-self (in the immunological sense), and the evolution of this capacity.—E.V.L.

See also absts. **2798-2799** (staphylococcal mastitis); **2806-2807** (anthrax); **2809-2814** (TB.); **2816-2817 & 2820** (Johne's disease); **2828** (pseudomonas); **2938** (salmonella vaccine for foxes); **2843** (adsorption of salmonella antigens); **2851** (differentiation between vaccinal and infectious brucella titres); **2853, 2856, 2858, 2860 & 2863** (brucellosis); **2866, 2872 & 2874** (leptospirosis); **2882** (moniliasis); **2899** (fluorescent antibody technique in malaria); **2904-2908** (F & M. disease); **2916** (rabbit pox and vaccinia); **2917** (non-infective soluble antigens prepared by gamma radiation); **2918** (arthropod-borne viruses); **2919** (Borna disease); **2923** (rinderpest); **2926** (myxovirus parainfluenza); **2928** (bovine rhinotracheitis); **2930-2931** (virus diarrhoea-mucosal disease, antigenic relationship); **2937-2938** (swine fever); **2946** (distemper); **2948** (canine virus hepatitis); **2954-2957** (Newcastle disease); **2962** (c.f. tests in virus diseases); **2963** (selective viral and rickettsial serum antibody absorption); **2982** (arthropods for fluorescent antibody investigations); **2983 & 2996** (helminths).

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

Harrison, I. R. (1961). **Further observations on 1-naphthyl-N-methyl carbamate as a veterinary insecticide.**—Vet. Rec. **73,** 290-292 & 293. [Author's summary modified.] **2971**

In laboratory and field tests, "Sevin" as a 5% dust gave excellent control of *Ornithonyssus sylviarum, Menacanthus stramineus* and *Menopon gallinae,* and it also had some activity against the poultry flea (*Ceratophyllus gallinae*). A single application controlled the pig louse (*Haematopinus suis*).

It was ineffective as a systemic insecticide for the control of warble-fly larvae (*Hypoderma bovis*).

Peterson, H. O., Meleney, W. P. & Cobbett, N. G. (1961). **The use of organic phosphorus compounds in destroying Oestrus ovis larvae.** — Proc. 64th Ann. Meet. U.S. Livestock Sanit. Ass., Charleston, 1960 pp. 178-186. [Authors' summary modified.] **2972**

In controlled experiments against the larvae of the nasal botfly of sheep, using Coumaphos (Co-Ral) as a 0·5% aqueous suspension dip; Dowco 109 and Ruelene administered in boluses and in wettable powder form in capsules; and dimethoate as a 10% premixed formulation, these compounds were safe and effectively destroyed *Oestrus ovis* larvae. The only toxicity encountered was with Dowco 109 used at 300 mg./kg.

Beesley, W. N. (1961). **Observations on the development of Hypoderma lineatum de**

Villiers (Diptera, Oestridae) in the bovine host.—Ann. trop. Med. Parasit. **55,** 18-24. [Author's summary.] 2973

The literature describing previous observations on the migration of *Hypoderma* within the bovine host is reviewed.

The incidence is recorded of *Hypoderma lineatum* larvae in the cattle slaughtered at Guildford and Reading abattoirs during the winters of 1957, 1958 and 1959.

Fewer gullets were infected with *H. lineatum* in the winter of 1958 than in 1957; this may be related to the cold wet summer of 1958, which probably affected the emergence and activities of the adult flies and perhaps also of the newly emerged 1st-instar larvae before they penetrated the skin of the host. The low incidence of oesophageal infection continued during the winter of 1959, probably as a result of the accumulated deficit of flies from the 1958 set-back.

The winter month or months in which the incidence of oesophageal infection reached a maximum varied considerably in different years at both abattoirs.

ter Borg, H. (1961). Die Bekämpfung der Dasselfliege in der Provinz Groningen. **[Control of warbles in Groningen.]** — Prakt. Tierarzt No. 4 pp. 130-132. 2974

Complete eradication of warbles in the Netherlands was considered possible by treatment of cattle on April 1st, May 1st and June 1st, for 2–3 years running, with 50 g. of derris powder and 5% of rotenone in 1 litre of cold water. In areas 20–25 km. wide, along the German and Belgian borders, treatment should be intensified.—E.G.

Kohler, P. H. & Rogoff, W. M. (1961). **Ruelene administered free-choice in a mineral mixture for cattle grub control.**—J. econ. Ent. **54,** 278-279. [Authors' abst. modified.] 2975

Ruelene in quantities of 8 or 24 g. per lb. of mineral mixture was offered to calves for 62 days beginning in December. At the end of this period, all warbles had been killed in treated calves while the controls averaged 25 warbles each. No symptoms of toxicity were noticed. Erythrocyte cholinesterase activity was depressed significantly in both treated groups. Ruelene at the higher concentration reduced palatability of the mineral mixture.

Marquardt, W. C. & Lovelace, S. A. (1961). **A comparison of dimethoate administered as an injection and in supplemental feed for control of cattle grubs.** — J. econ. Ent. **54,** 252-254. [Authors' abst. modified.] 2976

Hereford calves were treated late in January with dimethoate, administered either as a single i/m injection at 10 mg./kg. or for 10 days in supplemental feed at 2 mg./kg. daily. Injection resulted in 81% control and low-level feeding in 79% control of warbles. Among calves receiving dimethoate in the feed or by injection, 80% and 84% (respectively) had fewer than six warbles. Apparently some calves failed to take the supplemental feed, but control was good in those which took it.

Anon. (1961). **[Results of trials of phenothiazine against warble-fly larvae in cattle.]** — Veterinariya, Moscow No. 2 pp. 28-32. [In Russian.] 2977

Four large-scale field trials failed to demonstrate any beneficial effect of phenothiazine, given in the food at 5 g. a head daily or incorporated in salt licks, on the incidence of warbles.—R.M.

Larkin, P. J. (1961). **Control of the blue tick (Boophilus decoloratus) on cattle with pyrethrum sprays.**—Vet. Rec. **73,** 298-300. [Author's summary modified.] 2978

An investigation on 5 farms in the Rift Valley Province of Kenya showed that adequate control of *Boophilus decoloratus* on cattle could be obtained by spraying once a week with aqueous pyrethrum emulsions.

Hoogstraal, H., Kaiser, M. N., Traylor, M. A., Gaber, S. & Guindy, E. (1961). **Ticks (Ixodoidea) on birds migrating from Africa to Europe and Asia.**—Bull. World Hlth Org. **24,** 197-212. [Authors' abst. modified.] 2979

Hyalomma marginatum marginatum of Europe and Asia and *H. marginatum rufipes* of Africa, both reservoirs and vectors of organisms pathogenic to man and animals, have not infrequently been found far from their normal endemic geographical boundaries. Birds infested with the African *H. marginatum rufipes* were captured in Egypt during spring migration from East Africa to Europe and Asia. Between 1956 and 1960, 340 birds representing 22 forms (species and subspecies) were found infested by 1,025 immature ticks, all except 7 of which were or appeared to be *rufipes*. The period of attachment of immature stages of *rufipes* to their host is sufficient to suggest that many of these ticks are carried some distance into Europe and Asia.

Spickett, S. G. (1961). **Studies on Demodex folliculorum Simon (1842). I. Life history.**

—Parasitology **51,** 181-192. [Author's summary modified.] **2980**

Histological data are given on the location and frequency of the different stages of *D. folliculorum* in the hair follicles of man, and the relative duration of each stage and its movement in the follicle are deduced. A method of *in vitro* culture is described and data are given on the longevity of the various stages. Experiments on the behaviour of the different motile stages are described. It is concluded that the deutonymph is the distributive stage, and that distribution occurs over the skin surface. The life-cycle lasts approximately 14½ days, the duration of each stage being : ovum 60 hr., larva 36 hr., protonymph 72 hr., deutonymph 60 hr., adult 120 hr., interval between copulation and oviposition 12 hr.

West, B., Vidone, L. B. & Shaffer, C. B. (1961). **Acute and subacute toxicity of dimethoate.**—Toxicol. appl. Pharm. **3,** 210-223. [Abst. from authors' summary.] **2981**

Dimethoate was among the less toxic organic phosphate insecticides. The acute oral LD_{50} for rats was 200 mg./kg. body wt. Feeding comparatively high concentrations to rats and dogs for 90 days depressed blood cholinesterase, but caused no significant haematological or pathological changes.

Tobie, J. E., Burgdorfer, W., Larson, C. L., Evans, C. B. & Robinson, C. E. (1961). **Frozen sections of arthropods for histological studies and fluorescent antibody investigations.** — Exp. Parasit. **11,** 50-55. [Authors' summary modified.] **2982**

Specimens were quick-frozen in gelatin and sectioned in a freezing cabinet at −15°C. Sections with the internal structures excellently preserved were prepared from nymphal and adult *Dermacentor andersoni, Ornithodoros moubata* and *O. parkeri,* and from the cone-nosed bug, *Rhodnius prolixus.*

This technique was useful for, (a) histological studies of organ systems, (b) localization of parasites and disease agents, and (c) fluorescent antibody studies on disease agents in arthropods. Using conventional stains *Trypanosoma rangeli* was localized in the salivary glands of the host and by fluorescent antibody methods *Rickettsia rickettsii* was demonstrated in sections from whole ticks.

See also absts. **3031** (U.N. report on animal diseases, Saudi Arabia); **3114** (report, Bechuanaland); **3116** (book, parasitology).

PARASITES IN RELATION TO DISEASE [HELMINTHS]

Patnaik, B. & Das, K. M. (1961). **Diagnosis of fascioliasis in cattle by intradermal allergic test.** — Cornell Vet. **51,** 113-123. [Authors' summary modified.] **2983**

Forty cattle were tested intradermally with antigen prepared from *Fasciola gigantica* by desiccating the worms at 5°C. and triturating them in sterile physiological salt solution. Twenty-one cattle harbouring the parasites in the liver reacted positively. Four animals had hydatid cysts in the lungs; two of them which were positive to the skin test had *F. gigantica* in the liver, while the other two which were free from the fluke were negative to the skin test. Four animals that had no adult *Fasciola* but only scar tissue in the liver reacted positively to the test. Faecal samples from 21 animals harbouring adult worms in the liver were examined by (1) Benedek and Nemeseri's method, (2) Bruggemann's flotation method, and (3) by direct sedimentation. These methods were 95·2, 85·7 and 42·4% effective, respectively.

This simple and speedy method of skin-testing animals for diagnosis of fascioliasis in the field is recommended. All the infections dealt with in this paper were of *F. gigantica.*

Dawes, B. (1961). **On the early stages of Fasciola hepatica penetrating into the liver of an experimental host, the mouse: a histological picture.**—J. Helminth. R.T. Leiper Suppl. pp. 41-52. [Author's summary modified.] **2984**

Excystment of the metacercariae of *F. hepatica* by perforation of the inner cyst was witnessed, but the factors which control activation of the larva remain undetermined. Excystment occurred in two instances when cysts were administered to mice by i/p injections, active young flukes being recovered. It also occurred when cysts were administered to week-old chicks. Free flukes were recovered from the abdominal cavity in three instances, but liver lesions were not observed. Using photomicrographs an attempt was made to demonstrate that young flukes feed primarily on hepatic cells and in fact prefer them. They inevitably ingest blood, but it is claimed that they are not truly blood feeders. Young flukes recovered from the liver of the mouse range in length from about 0·3 mm. at 3–4 days to

4·85 mm. at 28 days from the time when cysts were administered by mouth. This accords fairly well with results reported in rabbits and g.pigs.

Stoican, E., Păunescu, G., Paul, I. & Pintilie, R. (1961). Un focar de trematodoză hepatică la raţe cu Metorchis xanthosomus (tratament şi profilaxie). **[Treatment and prophylaxis of Metorchis xanthosomus infestation, a liver fluke in ducks.]**—Probl. zoot. vet., Bucureşti **11,** No. 2. pp. 51-54. [In Roumanian. Summaries in French and Russian.] **2985**

The liver of infested ducks was lemon yellow, and gall bladder and bile ducts were enlarged. The mucous membrane lining the gall bladder was partly destroyed. There was fatty degeneration in the parenchyma. Doses of 1·5 ml./kg. body wt. of CCl_4 capsules were effective in about 72% of cases. The parasite was described in detail.—E.G.

Tewari, A. N. & Iyer, P. K. R. (1961). **Peritonitis in goats caused by Oesophagostomum sp.**—Indian vet. J. **38,** 11-16. **2986**

Oesophagostome nodules were found in the intestines of 24·3% of 3,596 goats. The histological characters of these and of similar lesions in the omentum, liver, and mesenteric lymph nodes were described. Pyogenic organisms were recovered from the peritoneal fluid in some cases.—R. N. Mohan.

Fitzsimmons, W. M. (1961). **The so-called cat and dog strains of Ancylostoma caninum.**—Vet. Rec. **73,** 585-586. **2987**

A. caninum has frequently been recorded as a parasite in the cat, but there is increasing evidence that the *Ancyclostoma* of cats is a distinct species, *A. tubaeforme;* under natural conditions there is no cross-infection. Among features distinguishing the 2 species are the length of the spicules, between 0·8 and 0·95 mm. in the male of *A. caninum* and 1·23 to 1·4 mm. in *A. tubaeforme,* and a relatively longer oesophagus in *A. caninum.*—E.V.L.

Rawes, D. A. (1961). **The activity of bephenium hydroxynaphthoate against hookworms in the dog.**—Vet. Rec. **73,** 390-391 & 392. [Author's summary modified.] **2988**

Bephenium hydroxynaphthoate was highly active against *Ancylostoma caninum* and *Uncinaria stenocephala* in dogs. The minimum effective dose level was 50 mg. base per kg. morning and evening; a single dose of 100 mg. base per kg. was much less efficient. No toxicity was observed but vomiting occurred in some cases.

Armour, J., Hart, J. A., Lee, R. P. & Ross, J. G. (1961). **The anthelmintic efficiency of bephenium hydroxynaphthoate against the pre-patent stages of gastro-intestinal strongyles in Nigerian zebu cattle.** — Vet. Rec. **73,** 234-236 & 237. [Authors' summary modified.] **2989**

Artificial infections were used in a trial of the larvicidal properties of bephenium hydroxynaphthoate against the gastro-intestinal strongyles of cattle. At 225 mg. per kg. body wt. the anthelmintic proved very effective against the 5th larval stages of *Haemonchus* spp. and *Oesophagostomum radiatum* and the 4th and 5th larval stages of *Cooperia* spp. Some action was recorded against the 5th larval stage of *Trichostrongylus axei* and the 4th larval stage of *Oe. radiatum.* The 4th larval phases of *Haemonchus* spp. and *T. axei* were not effectively removed. The authors discussed the practical application of these results in Nigeria.

Bailey, W. S. & Walker, F. F. (1961). **Observations on severe parasitic gastritis of cattle and its treatment with an organic phosphate.**—Auburn Vet. **17,** 64-68. **2990**

Three young bulls with severe *Ostertagia* and *Trichostrongylus* infestation that did not respond to phenothiazine and other anthelmintics were given 20 mg./kg. of coumaphos (Bayer 21/199) by mouth. Faecal egg counts decreased and the clinical condition of the animals improved.—M.G.G.

Herlich, H., Porter, D. A. & Isenstein, R. S. (1961). **Anthelmintic activity of Ruelene administered to cattle orally and topically.**—Vet. Med. **56,** 219-221. [Authors' summary modified.] **2991**

In limited tests Ruelene, administered orally to cattle at 40 to 60 mg./kg., had anthelmintic activity against *Haemonchus placei, Cooperia punctata* and *Oesophagostomum radiatum.* At 60 mg./kg. it was active also against *Ostertagia ostertagi, Trichostrongylus axei* and *T. colubriformis;* but since this dosage was lethal to one of three steers, the toxic effect requires additional investigation.

When applied topically at 75 mg./kg. Ruelene appeared to be effective against *H. placei,* but had erratic activity against *C. punctata, C. oncophora,* and *Oes. radiatum,*

and little or no activity against *O. ostertagi* and *T. axei.*

Heath, G. B. S. (1961). **Worms in sheep.**—Mod. vet. Pract. **42,** No. 7. pp. 34-37. **2992**

Believing that regular dosing of sheep with anthelmintics interfered with the development of self-cure and immunity, H. persuaded a number of farmers to adopt a new method of control — treat sheep only when the faecal egg counts approach 2,000 *Trichostrongylus* eggs per gramme. The method has been successful for the past 10 years; egg counts in untreated sheep have rarely exceeded 500 e.p.g.—M.G.G.

Sloan, J. E. N., Wood, J. C. & Rawes, D. A. (1961). **Field trials with synergised phenothiazine.** — Vet. Rec. **73,** 432-434 & 435. [Authors' summary modified.] **2993**

Field trials with a coroxon-phenothiazine (1·5/200 wt./wt.) mixture against nematodes in lambs are described.

The anthelmintic efficiency of the mixture at 200 to 300 mg. per kg. was compared with that of a standard phenothiazine wettable powder at 500 to 800 mg. per kg. and was assessed by post-mortem worm counts on 150 lambs. The mixture was as effective as phenothiazine against nematodes of the abomasum and much more effective against those of the small intestine.

Observations on weight gains are also recorded. A good clinical response was achieved in flocks heavily infested with intestinal *Trichostrongylus* spp. with greater improvement following the use of synergized phenothiazine. The small dose rate of the coroxon/phenothiazine mixture was a distinct practical advantage.

Condy, J. B. (1961). **Seasonal fluctuations in the worm egg counts of sheep in Southern Rhodesia.** — Brit. vet. J. **117,** 152-157. [Author's summary modified.] **2994**

Two flocks of sheep, kept under intensive and extensive systems, were observed for two years. The variations in faeces egg counts are discussed in relation to management and treatment with phenothiazine and tetrachlorethylene.

Gibson, T. E. (1961). **Controlled tests with three organic phosphorus compounds as anthelmintics against Haemonchus contortus in sheep.**—Vet. Rec. **73,** 230-231. [Author's summary modified.] **2995**

In controlled tests on artificially infected sheep, Trolene (ronnel or fenchlorphos) given at 110 mg. per kg. body wt. was 31% efficient; Neguvon (trichlorphon) at 100 mg. per kg. was 100% efficient; Ruelene at 75 mg. per kg. was 91% efficient.

Jarrett, W. F. H., Jennings, F. W., McIntyre, W. I. M., Mulligan, W. & Sharp, N. C. C. (1961). **Studies on immunity to Haemonchus contortus infection — double vaccination of sheep with irradiated larvae.**—Amer. J. vet. Res. **22,** 186-188. [Authors' summary modified.] **2996**

A vaccine was prepared by subjecting infective larvae of *Haemonchus contortus* to 40,000 roentgens of X-radiation. When 2 doses of vaccine (each containing 10,000 larvae) were given to lambs, immunity sufficient to withstand a challenge with 50,000 normal larvae was produced.

Everett, G. & Gibson, T. E. (1961). **The effect of passage through the alimentary canal of the sheep on the development of eggs of Nematodirus battus.**—Vet. Rec. **73,** 293-294 & 295. [Authors' summary.] **2997**

When freshly passed eggs of *N. battus* were administered to a lamb the majority passed through the alimentary canal within 48 hours. These eggs were undamaged and developed in a similar manner to eggs from the same batch which had not been passed through a lamb. Of the relatively few eggs which were passed in the faeces of the lamb between 48 and 72 hours after dosing some 40% were non-viable but the rest developed normally. The significance of these observations in the epidemiology of nematodiriasis is discussed.

Brunsdon, R. V. (1961). **The distribution of Nematodirus spp. occurring in sheep in New Zealand.**—N. Z. vet. J. **9,** 16-18. [Author's summary modified.] **2998**

A survey based on gut samples submitted for routine diagnostic worm counts at Wallaceville showed that three species of *Nematodirus* commonly occur in sheep in New Zealand—*N. filicollis, N. spathiger,* and *N. abnormalis. N. filicollis* and *N. spathiger* are the important species. Although *N. abnormalis* is widely distributed, individual infestations are usually small. *N. battus* has not been observed in New Zealand.

Brunsdon, R. V. (1961). **The effect of a subclinical infestation of Nematodirus spp. upon**

the liveweight gain of lambs.—N. Z. vet. J. **9,** 13-15. [Author's summary modified.] **2999**

Lambs in which *Nematodirus* infestation was suppressed completely by fortnightly drenching with bephenium embonate showed a weight gain response of 7·3 lb. over subclinically infected controls.

Dobson, C. (1961). **Certain aspects of the host-parasite relationship of Nematospiroides dubius (Baylis). I. Resistance of male and female mice to experimental infections.** — Parasitology **51,** 173-179. [Author's summary modified.] **3000**

More parasites were harboured, during both the larval and adult parasitic phases, by male than by female mice. The worms occupied a similar relative length of the intestine between the stomach and the caecum in both male and female mice. Significantly more of the intestine was infected on the fifth day than on the tenth day of infection.

Oldham, J. N. (1961). **Studies on parasites of the grey squirrel (Sciurus carolinensis Gmelin) from south eastern England. I. Helminth parasites.**—J. Helminth. R. T. Leiper Suppl. pp. 127-130. [Author's conclusions modified.] **3001**

It now seems established that *Trichostrongylus retortaeformis* occurs not only in rabbits and hares but also in grey squirrels, at least in south-east England, and that it has succeeded in adapting itself to ruminant hosts such as the goat, Chinese water deer and blackbuck. It is possible that the grey squirrel could act as a disseminator.

Clapham, P. A. (1961). **Recent observations on helminthiasis in some British game birds.** —J. Helminth. R. T. Leiper Suppl. pp. 35-40. [Author's summary modified.] **3002**

Helminth parasites may be important causes of disease and death, both in penned stock and in wild game birds. *Syngamus trachea* is probably the most important, but species of *Heterakis* follow closely, having both a direct and an indirect effect. *Trichostrongylus tenuis* is potentially important in pheasants, and the death rate could be serious under careless management. Poultry near or with penned birds are dangerous as many helminths have a wide host distribution among related gallinaceous birds. Thus species of *Capillaria* and *Heterakis* which normally cause little trouble among poultry, can cause death and disease among game birds.

Colglazier, M. L. & Enzie, F. D. (1961). **Treatment of experimental lungworm infections in calves and pigs with cyanacethydrazide.** — Proc. helm. Soc. Wash. **28,** 86-91. **3003**

Nine calves and ten young pigs, experimentally infected with *Dictyocaulus viviparus* and *Metastrongylus* spp. respectively, were treated with cyanacethydrazide, either at the recommended or at a slightly higher dosage. No clinical improvement was observed, and on P.M. examination most of the treated animals harboured as many lungworms as did untreated controls.—J. Rose.

Szwejkowski, H. (1960). Sektionsbild der Dioctophymease der Hunde. **[Post-mortem appearance of Dioctophyme infestation in dogs.]** — Arch. exp. VetMed. **14,** 1184-1191. **3004**

Details were given of *Dioctophyme renale* infestation in 27 of 603 dogs, seven months to nine years old, examined in Poland during 1937–39. There have been no cases in recent years.—E.G.

See also absts. **3031** (U.N. report on animal diseases in Saudi Arabia); **3116** (book, parasitology).

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

Omar, A. R. & Collins, G. W. (1961). **A malignant intraocular melanotic tumour in a goat.** —J. comp. Path. **71,** 183-190. [Authors' conclusions modified.] **3005**

A malignant melanotic tumour in a 2-year-old female goat, with visceral metastases, is described with the macroscopic and histological findings. The tumour apparently originated intraocularly; this has not previously been reported in the goat.

The origin of melanoblasts and the classification of melanotic tumours are briefly discussed.

Owen, L. N. & Stevenson, D. E. (1961). **Observations on canine osteosarcomata.** — Res. vet. Sci. **2,** 117-129. [Authors' summary modified.] **3006**

Clinical and pathological studies on 15 cases of osteosarcomata in dogs and attempts

at treatment in 2 cases are described.

Arteriography revealed vascular changes similar to those seen in malignant disease of bone in man. Tumour blood supply (studied in one case, using Lissamine green intravenously) was reduced at the periphery of viable and necrotic tumour tissue.

Treatment of one dog with triethylene thiophosphoramide resulted in temporary regression of the tumour mass. A second dog with bilateral osteosarcomata of the radii was treated by intra-arterial injections of triethylene thiophosphoramide and by limb perfusion, using nitrogen mustard in an extracorporeal circulation. Tumour growth was significantly arrested.

Cotchin, E. (1961). **Canine ovarian neoplasms.**—Res. vet. Sci. **2,** 133-142. [Author's summary modified.] **3007**

An account is given of ovarian tumours from 69 bitches. Of these, 20 had adenomas, 5 adenocarcinomas, 30 granulosa-cell tumours, 8 'seminomas' and 6 other miscellaneous types of ovarian neoplasm.

The average age of affected bitches was 8·9 years. At least 29 had pyometra. The macroscopic and microscopic features of the tumours are described.

Attention is drawn to the tendency shown by canine granulosa-cell tumours to have a tubular structure, and in some instances an appearance approaching that of the canine testicular Sertoli-cell tumour.

Helmboldt, C. F. & Wills, F. K. (1960). **Bronchiolar carcinoma in the mink.**—Arch. exp. VetMed. **14,** 1163-1169. [In English. Summary in German.] **3008**

Of 600 mink examined P.M., two were affected with bronchiolar carcinoma, one of which was associated with pulmonary osteoarthropathy. The histology of the lesions is discussed and illustrated.—E.G.

Schulze, E. (1961). Spontantumoren der Schädelhöhle und Genitalorgane bei Sprague-Dawley- und Bethesda-Black-Ratten. **[Spontaneous neoplasms in cranial cavity and genital organs of laboratory rats.]**—Z. Krebsforsch. **64,** 78-82. [Summary in English.] **3009**

S. found 66 tumours (mostly adenomas and carcinomas) in 1,373 rats. An osteoma was found in the cranial cavity of one. 34 tumours of uterus and ovaries were found in 804 female rats aged between 13 and 40 months; in half of these there was also endometritis.—R.M.

Lombard, C. (1961). Epidermisation conjonctivale précancereuse des bovidés et virus filtrant. **[Cancer eye in cattle: precancerous change provoked by instillation of tumour filtrate onto the conjunctiva.]**—C. R. Acad. Sci., Paris **252,** 2631-2632. **3010**

Cancer eye in Normandy cattle was a pavement-cell epithelioma. Tumour tissue was homogenized with ten parts of Ringer's soln., centrifuged and passed through a Seitz 'serum' filter. 2 ml. was instilled onto the conjunctiva of one eye in two heifers and two cows, and this was repeated the next day. There was no immediate conjunctival reaction. A slight swelling was present in the conjunctiva of one heifer and a cow 50 days afterwards. The swellings stayed the same size, a few millimetres diam. After 6 months one swelling, arising from the third eyelid, was excised. Histological examination revealed keratinization of the conjunctival epithelium, which was thought to be a precancerous change.—R.M.

Tolle, A. (1961). Die fluoreszenzserologische Diagnose der Rinderleukose. **[Fluorescent antibody technique in the diagnosis of bovine leucosis.]**—Dtsch. tierärztl. Wschr. **68,** 193-202. [Summary in English.] **3011**

The agent of bovine leucosis was adapted to new-born mice. Impression smears of mouse tumour or blood smears from cattle with leucosis were treated with the serum under test. Antigen-antibody reaction was detected by adding anti-bovine gamma-globulin of rabbit origin labelled with fluorescein isothiocyanate. Blood samples from 510 Black Pied Lowland cattle were tested in this way and 25 gave positive fluorescein tests. Of these 25, lymphocyte counts of up to 6,000/cu. mm. were present in 7, counts of 6,000–13,500 in 30, and over 13,500 (positive leucosis count) in 9. Among the 93 negative reactors to the fluorescein test 18 had counts between 6,000 and 13,500 and 3 had counts over 13,500. Tests were also made for presence of antigen in bovine blood, by allowing blood smears to react with leucosis immune serum. There were more positive tests for antigen than positive tests for antibody. T. hoped that further tests would confirm the specificity of the fluorescein test. It is possible that viruses other than leucosis virus could give positive tests.—R.M.

NUTRITIONAL AND METABOLIC DISORDERS

Gordon, J. G. (1961). **The relationship between rumination and frequent feeding.** — Animal Behaviour **9**, 16-19. [Author's summary modified.] **3012**

Food utilization by sheep is increased when the ration is given in small frequent feeds instead of one large feed. The relationship of rumination to this phenomenon was studied.

Total rumination time, the number of periods of rumination and the total number of boli had no relationship to the increased efficiency of food utilization, but the rate of regurgitation of boli was more rapid in all sheep when frequently fed, and this may reflect a general increase of motility of the foregut, of secretion and of digestion.

Schinckel, P. G. & Short, B. F. (1961). **The influence of nutritional level during pre-natal and early post-natal life on adult fleece and body characters.** — Aust. J. agric. Res. **12**, 176-202. [Authors' summary modified.] **3013**

The effect was studied of high and low levels of feed intake during pregnancy in ewes and from birth to 4 months of age in their lambs, on adult body weight and wool production.

As compared with the high intake groups, lambs from the low intake ewes were 34% smaller at birth and 9% smaller at maturity. They also had about 15% fewer wool follicles per sheep, and produced about 8·5% less wool as adults.

The results of low levels of feed intake between birth and 4 months were (a) a slower growth rate and a reduction (about 10%) in mature body weight, (b) delayed maturation of the follicle population, but no apparent permanent reduction in numbers, (c) the production of less (about 12%) wool as adults, owing to a smaller (about 10·5%) fibre weight.

Dehority, B. A., Rousseau, J. E., Jr., Eaton, H. D., Myers, G. S., Jr., Grifo, A. P., Jr., Dicks, M. W., Hazzard, D. G., Helmboldt, C. F., Gosslee, D. G., Thomas, J. W., Sykes, J. F. & Moore, L. A. (1961). **Effect of additional magnesium, tocopherol, and cod liver oil to a whole milk diet on some biochemical constituents in serum, soft tissue, and bone of calves.**—J. Dairy Sci. **44**, 58-84. **3014**

Forty-eight week-old Guernsey bull calves were fed a basal diet of whole milk plus essential minerals (with the exception of magnesium), vitamins A and D, and chlortetracycline. To this were added, per 100 lb. body wt. daily, 2·5 g. magnesium, 200 mg. D,L-alpha tocopherol acetate and 1 oz. cod-liver oil, separately and in all possible combinations. The groups were unequal in size, to allow for high mortality. None of the calves fed the basal diet died or showed signs of hypomagnesaemia, but there were several deaths with signs of vitamin E deficiency in calves fed cod-liver oil with or without Mg. Four calves in each group were slaughtered after 28 weeks and the following observations were made: (1) The addition of Mg resulted in higher terminal inorganic P, Mg and total tocopherol levels, lower heart and skeletal muscle Ca and higher Mg (in the absence of tocopherol), and lower Ca and higher Mg in the bone ash. (2) The addition of cod-liver oil produced amongst many effects, lower weight gains, slight heart dysfunction, higher levels of potassium and vitamin A in the serum and lower levels of Mg, tocopherol and carotenoids, and higher levels of Ca and lower levels of Mg in muscle and bone. (3) The tocopherol largely offset the effects of cod-liver oil with the exception of the heart dysfunction. It did little to prevent the depression of calcium content of soft tissues of the calves fed magnesium.—E. J. Castle.

Van Horn, H. H., Jr. & Bartley, E. E. (1961). **Bloat in cattle. I. Effect of bovine saliva and plant mucin on frothing rumen contents in alfalfa bloat.** — J. Anim. Sci. **20**, 85-87. [Authors' summary modified.] **3015**

The addition of 80 ml. of either saliva or linseed meal mucin solution increased the rate of release of trapped gas from 200-g. samples of frothing rumen contents. Reduced salivation may therefore be a factor in the aetiology of bloat.

Fagan, V. J., Iles, R. D., Slowitsky, Z. & Brocksopp, R. E. (1961). **Some observations on the high level copper supplementation of pig rations.** — J. agric. Sci. **56**, 161-164. [Authors' summary modified.] **3016**

Experiments are reported in which the effect of high-level copper supplementation of pig rations on growth rate; food conversion; and carcass quality was observed.

In nine of ten experiments a markedly variable positive increase in the growth rate of the pigs receiving copper was recorded.

Having regard to the real danger of toxicity associated with copper in pig rations

in Tasmania and the uncertainty of any advantage gained its use as a general practice is not recommended. It should be confined to properties on which advantages from the use of copper have been established and further where intelligent and careful use of the copper is certain.

Hill, C. H. & Matrone, G. (1961). **Studies on copper and iron deficiencies in growing chickens.**—J. Nutr. 73, 425-431. [Authors' summary modified.] **3017**

The initial effect of copper deficiency was a decrease in the number of erythrocytes, whereas the initial effect of iron deficiency was a decrease in the haemoglobin content of the erythrocytes. Copper deficiency decreased feather pigmentation and reduced the heart cytochrome oxidase activity, while iron deficiency affected pigmentation only slightly and did not reduce cytochrome oxidase activity. The requirement of the chick for these two minerals is discussed.

Newland, H. W. & Davis, G. K. (1961). **Placental transfer of manganese in swine.**—J. Anim. Sci. **20,** 15-17. [Authors' summary modified.] **3018**

Sows fed natural foodstuffs containing 6 and 100 p.p.m. manganese produced foetuses of essentially the same weight. The concentration of manganese in the maternal serum was related to the level in the ration: on the 60th, 80th and 110th day of gestation the conc. of manganese was significantly higher in the foetuses from sows on the higher level of dietary manganese. Radio-manganese was transferred in detectable amounts to the 110-day pig foetus during a three-hour period.

Hurwitz, S. & Griminger, P. (1961). **Partition of calcium and phosphorus excretion in the laying hen.** — Nature, Lond. **189,** 759-760. **3019**

The intake and excretion of Ca and P were measured daily in four hens surgically prepared for the separate collection of urine and faeces, and fed a diet containing 2·64% Ca and 0·50% P for 7 consecutive days. The mean total percentage absorption of Ca was 67·8 and of P 67 and the mean total retention was (respectively) 60·4 and 15·5. Of the Ca and P excreted, 19% and 62% (respectively) was found in the urine. More than 58% of the ingested Ca was deposited in the egg.

—E. J. Castle.

Supplee, W. C., Creek, R. D., Combs, G. F. & Blamberg, D. L. (1961). **The zinc requirements of poults receiving practical diets.** — Poult. Sci. **40,** 171-176. [Authors' summary modified.] **3020**

In all of 5 trials poults receiving supplementary zinc gained more weight than controls.

Extensive feather abnormality and a significant incidence of transitory hock disorder occurred in a four week trial with a maize-soya ration containing 42 p.p.m. adventitious zinc, but only a minor incidence of either abnormality when the ration was supplemented with 50 p.p.m. zinc.

Hemingway, R. G. (1961). **Effects of salt and other fertilisers on yield and mineral composition of forage crops. III. Herbage.**—J. Sci. Fd Agric. **12,** 398-406. [Author's abst. modified.] **3021**

Repeated application of ammonium sulphate reduced K concentrations. Fertilizers did not alter the Ca content of either grass or clover and, apart from superphosphate, had no effect on P content. Three cwt. of ammonium sulphate increased Mg content by an average of 14% for grass and 4% for clover, while 2 cwt. of potassium chloride or 4 cwt. of salt depressed it by 7·5% and 4% respectively. The greatest reductions in herbage Mg due to potassium chloride were in the late-season samples. A small dressing of magnesium sulphate increased herbage Mg in one of two experiments.

Gershoff, S. N. & Andrus, S. B. (1961). **Dietary magnesium, calcium, and vitamin B_6 and experimental nephropathies in rats: calcium oxalate calculi, apatite nephrocalcinosis.**—J. Nutr. 73, 308-316. [Abst. from authors' summary.] **3022**

Primary renal deposits of oxalate with secondary obstruction involving the lower urinary tract occurred in vitamin B_6-deficient rats, accompanied by increased excretion of oxalic and xanthurenic acids and by a marked decrease in citric acid excretion. Diets high in magnesium (400 mg per 100 g.) greatly reduced the deposition of oxalate in vitamin B_6-deficient rats although they remained hyperoxaluric.

Varying the dietary calcium level from 0·2 to 1·2%, in conjunction with vitamin B_6 deficiency, demonstrated a direct correlation between dietary calcium and the extent of oxalate deposition, an effect that became more

pronounced when combined with low dietary magnesium.

Crowley, J. P. (1061). **Rickets in November-born lambs.**—Vet. Rec. **73,** 295-297. [Author's summary modified.] 3023

This paper describes an outbreak of rickets in 4-month-old November-born lambs. It is suggested that the cause was vitamin A: vitamin D imbalance. Half of the affected animals were given vitamin D parenterally. Subsequently, both treated and control lambs recovered and gained in weight, recovery coinciding with an increase in the mean daily amount of sunshine.

Bélanger, L. F. & Migicovsky, B. B. (1961). **Extratrabecular crystallization in rickets; effects of vitamin D, calcium and norethandrolone.**—Proc. Soc. exp. Biol. N.Y. **106,** 19-21. [Authors' summary modified.] 3024

Large extra-trabecular crystals were found in rachitic bones of chicks. These disappeared after treatment with vitamin D.

Chance, C. M. & Loosli, J. K. (1961). Effect **of a complex mineral-vitamin supplement on milk production.**—J. Dairy Sci. **44,** 498-502. [Authors' summary modified.] 3025

In 4 experiments with high-producing Holstein cows widely varying types and qualities of forages were fed, different hay to grain ratios were tested and various ingredients were used in the grain mixtures.

The mineral-vitamin mixture had no measurable influence on milk or fat production, body weight gain, general appearance, health, or on the efficiency of milk production.

Szokolóczy, I. (1961). Választási borjak A-avitaminosis okozta szembetegsége. [**Eye disease associated with vitamin A deficiency in weaned calves.**]—Mag. állator. Lapja **16,** 25-28. [In Hungarian. Summaries in English and Russian.] 3026

A condition affecting mainly the eyes was observed in 15 calves 2–6 months old in one herd. Husbandry, symptoms and eye lesions were described. Blood carotene values of 10 calves were below 50 μg.% (normal is 200 μg.%), and vitamin A deficiency was diagnosed. Differential diagnosis was discussed, the P.M. picture of 2 calves that died was described, details of treatment were given, and the aetiology was discussed.

—A. Sebesteny.

Kraft, H. (1961). Durch Vitamin-E-Mangel bedingte Herzmuskelschäden bei Zootieren. [**Vitamin E deficiency as cause of myocardial damage in zoo animals.**] — Kleintier-Praxis **6,** 64-66. 3027

A description of myocardial lesions associated with vitamin E deficiency, in a Dahomey calf five weeks old, three camels three weeks old, a day-old camel and a newborn buffalo calf.—E.G.

Marston, H. R., Allen, S. H. & Smith, R. M. (1961). **Primary metabolic defect supervening on vitamin B_{12} deficiency in the sheep.** —Nature, Lond. **190,** 1085-1090. 3028

As is well known cobalt deficiency in sheep changes the nature of the microflora of the rumen and as a result the production of vitamin B_{12} decreases. The synthesis of B_{12} in the rumen falls from about 600–1,000 μg./day to less than 50 μg./day. The level of B_{12} in the liver falls to below 0·15 μg. per gramme of liver. This is the critical level and with any further fall there is marked loss of metabolic efficiency. The appetite of the sheep decreases and death from inanition is the final stage.

In this series of papers evidence of the nature of the metabolic defect which produces these striking effects in ruminants is given. The metabolic defect has been shown to be the inability of the depleted ruminant to deal with propionic acid. Evidence that the metabolism of glutamic acid is not altered and is not involved in B_{12} deficiency disease in ruminants is also produced.

Becker, W. (1961). Bekämpfung der Ferkelverluste durch Vitamin-behandlung der Sauen. [**Vitamin treatment of sows for preventing piglet losses.**]—Mh. VetMed. **16,** 171-175. 3029

During 1959, in the Demmin district of East Germany, 1,612 sows from 57 piggeries produced 21,086 piglets. The number of stillbirths was not known. During the first eight weeks of life, 4,082 piglets (19·4%) were lost from all causes. Sixteen piggeries where piglet mortality was well over 20%, were selected for prophylactic vitamin treatment, those with a mortality rate of under 20% were controls. Thus 816 pregnant, non-pregnant and suckling sows and 34 boars were given two s/c doses of 3 ml. each at an interval of 4 weeks, of a vitamin preparation containing 200,000 i.u. of vitamin A, 20,000 i.u. of vitamin D_3, and 10 mg. of vitamin E, per ml. In the first quarter of the year, before treatment commenced, monthly piglet losses averaged 34·4%, during the second and third quarter, after

treatment, it was 12·6%. In controls losses were 24·9% and 15·6% respectively. The piglet mortality rate during the first quarter of the year was stated to be generally higher. This was considered to be due to depletion of vitamin reserves in the dam's organism during the winter, which resulted in the reduction of the vitamin content in colostrum and milk, below the requirement level of the offspring. The average survival rate per litter in problem herds increased from 5·3 before, to 7·4 after treatment. In controls survivors per litter during the first quarter averaged 6·6 as compared with 7·1 for the subsequent six months.—E.G.

Passmore, R. (1961). **On ketosis.** — Lancet, April 22nd, 839-843. [Author's summary.] **3030**

The onset of ketosis depends on a number of factors, and not simply on the ratio of fat to carbohydrate in the diet.

The primary ketone body is acetoacetic acid, which is enzymatically reduced to β-hydroxybutyrate in the tissues. Both substances are present in the urine during ketosis, the β-hydroxybutyrate increasing with the severity of the ketosis.

The factors involved in the production of ketosis include: species variation, obesity, sex, exercise, thermal changes, degree of hydration, and the effect of some hormones—*e.g.* insulin and corticotrophin. Their complex interactions and relations are difficult to assess experimentally, and the results obtained are often conflicting.

It is suggested that ketosis arises whenever there is insufficient reduced triphosphopyridine nucleotide (TPNH) to effect fat synthesis. An important source of TPNH is the pentose-phosphate shunt—an alternative route to the Embden-Meyerhof pathway by which glucose is converted to pyruvic acid. The body can apparently make use of either pathway to varying extents which depend on circumstances not yet elucidated.

The pentose-phosphate shunt seems of great importance in the understanding of some clinical phenomena, but an explanation in biochemical terms of the physiological factors which lead to ketosis has yet to be produced.

DISEASES, GENERAL

Salah, M. N. (1961). **United Nations. Report to the Government of Saudi Arabia on the control of animal diseases.** pp. 20. Rome: Food and Agriculture Organization of the United Nations. [FAO/ETAP Report No. 1311.] **3031**

The most important animal diseases in Saudi Arabia are enzootic pneumonia of sheep and goats, *Fasciola gigantica* and *Linognathus* infestations in sheep, mastitis and tick infestation in cattle, TB. in imported cattle, and *Trypanosoma evansi* infection, mange and echinococcus infestation in camels. F. & M. disease is common as a mild disease in cattle. The livestock and poultry populations were estimated.—M.G.G.

I. Rose, H. (1961). Jahresbericht 1959/60 der Schweinekrankheiten einer Landpraxis im Landkreis Hameln-Pyrmont. **[A year's survey of pig diseases in a veterinary practice in the Hamelin-Pyrmont region.]** — Inaug. Diss., Hanover pp. 26. **3032**

II. Fickel, S. (1961). Jahresübersicht 1959/60 der Schweinekrankheiten in einer tierärztlichen Landpraxis im Landkreis Plön/Schleswig-Holstein. **[A year's survey of pig diseases in a veterinary practice in Schleswig-Holstein.]** — Inaug. Diss., Hanover pp. 44. **3033**

I. The practice included 325 premises containing 9,000 pigs. Housing conditions and diet were mainly inadequate. The 10 commonest diseases were piglet anaemia, enteritis, oedema disease, exudative dermatitis, mange, agalactia, dystokia, rickets and osteomalacia, anoestrus, and erysipelas; 1,351 pigs fell ill, most of them piglets and breeding animals. It appeared that many diseases of piglets, oedema disease in particular, predisposed pigs to circulatory disorders in adult life. Of 18 pigs that died from fatal syncope, 8 had recovered from oedema disease and 3 from anaemia. Of 6 pigs with lung oedema, 4 had previously had oedema disease.

II. In 12 months F. recorded 950 cases of illness in pigs, in a practice including 155 premises with pigs. The 10 most important diseases were puerperal sepsis, erysipelas, piglet anaemia, rickets and osteomalacia, influenza, dystokia, agalactia, enteritis, oedema disease, and cannibalism.—M.G.G.

Lucas, H. (1961). **Die statistische Erfassung** der Hühnererkrankungen von 1949 bis 1960 und der Stand der Salm. pullorum-Seuche

von 1953 bis 1961 im Raume Südhessen. **[Poultry disease statistics 1949-1960 and pullorum disease in South Hesse during 1953-1961.]** — Dtsch. tierärztl. Wschr. **68,** 273-276. [Summary in English.] **3034**

Of 12,815 P.M. examinations in fowls in South Hesse, fowl paralysis and avian leucosis accounted for 17·2%, coccidiosis for 15·9%, helminths for 12%, Newcastle disease for 6·9% and deficiencies, nutritional and metabolic disorders for 8·7% of deaths. About 4% died of round heart disease, 4·5% of respiratory diseases, 3·4% of salmonellosis, 7·7% of salpingitis and peritonitis, 1·4% of aspergillosis, 1·4% of TB., 1% of visceral gout and 1% of fowl pox. Other diseases included omphalitis, coligranulomatosis, ecto-parasites and poisoning.

Of 479,474 blood samples 9,786 were positive for *Salmonella pullorum*.—E.G.

Taylor, J. C. & Blackmore, D. K. (1961). **A short note on the heavy mortality in foxes during the winter 1959-60.** — Vet. Rec. **73,** 232-233. [Authors' summary modified.] **3035**

Many wild foxes died in Gt. Britain between November 1959 and April 1960. No infectious agent has been incriminated conclusively.

Symptoms were mainly nervous. Lesions were inconsistent; haemorrhages in the lungs were often noted.

Most deaths occurred in arable areas, and the possibility that chlorinated hydrocarbons used in seed dressings may be indirectly poisoning foxes is discussed.

A detailed account may be published later.

Graham-Jones, O. (1961). **Notes on the common tortoise. IV.—Some clinical conditions affecting the North African tortoise ("Greek" tortoise), Testudo graeca.**—Vet. Rec. **73,** 317-320 & 321. **3036**

An account of the symptoms and treatment of diseases of the outer integument, eye, ear, mouth, skeleton, respiratory and intestinal systems, and of parasitic infestations of tortoises.—M.G.G.

Mätzke, U. (1961). Die Eignung der Akkomodabilitätsprüfung bei der Spastischen Parese des Rindes. **[Bovine spastic paresis: response of muscles to electric current.]** — Inaug. Diss., Hanover pp. 64. **3037**

There was practically no difference in the manganese content of hair from healthy cattle and cattle with spastic paresis. The likelihood that the disease resulted from damage to the limb muscles, possibly due to developmental disturbances, was discussed. Based on the observation that healthy muscle can adapt itself to impulses of gradually increasing electric current while damaged muscle does not and contracts at currents of low intensity, this differential adaptability phenomenon was used for the identification of implicated muscles in a group of 27 cattle with spastic paresis of varying extent. It was found that the gastrocnemius muscle was always affected. In two cases, however, there was also damage to the biceps femoris, semi-membranosus, semitendinosus and quadriceps femoris.—E.G.

Dalgarno, A. C. & Hill, R. (1961). **A note on the histological appearance of periodontal tissues associated with premature loss of incisor teeth in sheep.**—Res. vet. Sci. **2,** 107-111. **3038**

A comparison was made of histological sections of the central incisor teeth and surrounding tissue of sheep of varying ages from flocks in which loss of incisor teeth was rare and from flocks in which premature loss was common. In young affected animals, the lingual sulcus had deepened slightly, and there was a tendency for round cells to accumulate round the epithelial attachment: at 2½ years the sulcus had deepened to form a pocket with a large accumulation of round cells. At 3½ years the periodontal pockets were deeper, round cells had spread into other regions of the dental membrane and some resorption of alveolar bone had occurred. These findings became more apparent with advancing age. The study did not reveal the cause of early loss of incisor teeth.—E.V.L.

I. Lamikhov, K. F. & Fel'dman, I. I. (1961). **[Role of breeding-sows in porcine atrophic rhinitis.]**—Veterinariya, Moscow No. 2 pp. 38-41. [In Russian.] **3039**

II. Andriyan, E. A. (1961). **[Efficacy of bicillin, terramycin and biomycin in porcine atrophic rhinitis.]** — Ibid. pp. 41-42. [In Russian.] **3040**

I. The authors confirmed that the incidence of atrophic rhinitis was higher among the offspring of gilts than older sows. Thus at autumn farrowing of pigs kept in summer pens, the incidence of the disease was 15% in 795 piglets from 99 gilts compared with 2% in 697 piglets from 81 older sows (64 of which were over 3 years old). In a piggery that had been kept empty, disinfected

and then re-stocked, incidence was 26% in 822 piglets from 108 gilts compared with 3·8% in 1,338 piglets from 154 sows (62 over 3 years old). It appeared to be possible to eradicate the disease by breeding from older sows only.

II. The three antibiotics are better known as benzathine pencillin, oxytetracycline and chlortetracycline, respectively. They were administered prophylactically by mouth to sows (commencing immediately after farrowing) and/or to their litters up to 30 days of age. For example, doses of chlortetracycline were 1 g. daily for 15 days for sows, 20 mg. daily for piglets aged 2–10 days and 175 mg. daily at 20–30 days of age. Results were assessed at 7 months of age by comparison with untreated controls. About 80 pigs were treated with each antibiotic and there was a similar number of controls. In pigs from sows treated with either tetracycline drug, incidence of rhinitis was 2·5% compared with 19% in controls. In piglets treated with chlortetracycline it was 6·8% compared with 40% in controls.—R.M.

Zotov, A. P. & Blinov, P. N. (1961). **[Porcine atrophic rhinitis: isolation of filtrable agent and preparation of a diagnostic allergen.]**—Veterinariya, Moscow No. 3 pp. 32-36. [In Russian.] **3041**

Suspensions of nasal mucosa, kidney, lymph node, brain and other tissues from 8 affected pigs, were treated with penicillin and streptomycin, and then injected into the yolk sac of chick embryos aged 6–7 days. Such material, after 4–6 passages, killed 60–70% of embryos 5–10 days after inoculation. The authors failed to isolate bacteria or PPLO from embryos. Small bodies were seen inside and outside nuclei or inside degenerate nuclei by microscopic examination of stained yolk-sac smears. Altogether 14 strains of a transmissible agent pathogenic for chick embryos were obtained. They passed Berkefeld V and N filters, and survived storage for 6 months in a refrigerator.

Twenty-four piglets were inoculated (mostly intranasally) with chick-embryo material, of the 3rd, 12th and 20th passages: 7 died 20–30 days after inoculation. Of the survivors, an unstated number developed bronchopneumonia and gastro-enteritis, and after 2–3 months atrophic rhinitis. Material of the 20th passage appeared to be of low virulence for pigs,

Allergens were prepared from purified, infected chick embryo material, autoclaved before use. 16 of 18 experimentally infected pigs reacted to i/d injection of allergen; 16 of 17 healthy pigs failed to react. Results were read 24 hours after injection. Of 778 pigs on 8 infected farms, 193 reacted to the test. Of 146 pigs on 3 uninfected farms only 1 reacted. —R.M.

Groulade, P., Fournier, J., Drieux, H. & Labie, C. (1961). Erythroblastose accompagnant un syndrome à prédominance épileptoïde chez le chien. **[Erythroblastosis accompanying epileptiform fits in dogs.]** — Bull. Acad. vét. Fr. **34,** 37-41. **3042**

Eight dogs between 3 months and 3 years old had erythroblastosis of varying severity accompanied by epileptiform fits and/or vomiting of bile. The blood content of urea, glucose and proteins and the leucocyte picture were normal. Tests for distemper, hepatitis, rhino-tonsillitis, leptospirosis and toxoplasmosis were negative. Five dogs died during or shortly after a violent fit. P.M. and histological examination of 2 dogs revealed enlargement and congestion of the spleen, congestion of the liver, brain and popliteal lymph nodes, and in one case vegetative endocarditis. The possible pathogenesis was discussed.—M.G.G.

Hansen, H.-J. & Holm, H. (1960). Über pulmonale Osteoarthropathie beim Nerz. **[Pulmonary osteoarthropathy in mink.]** — Arch. exp. VetMed. **14,** 1175-1183. **3043**

Osteoarthropathy, associated with papillomatous adenocarcinoma of the bronchial glands, was described in three mink. Subperiosteal bone formation was present in the leg bones. Oedema of the legs was a characteristic clin. symptom.—E.G.

Oyrzanowska, J. (1961). Ogniskowa martwica wątroby norek. **[Focal necrosis of the liver in mink.]**—Med. Wet., Warszawa **17,** 33-37. [In Polish. Summaries in English, French and Russian.] **3044**

Necrosis of the liver was found in 125 of 355 mink during 1956/59; in 21 the lesions were confined to the left lobe. The author discussed the aetiology and its probable association with deficiency of methionine and vitamins B and E. The presence of lesions in the left lobe only may be due to a minor nutritional deficiency superimposed on the poorer blood supply received by the left lobe. —M. Gitter.

Phillips, B. P. & Wolfe, P. A. (1961). **Pneumonic disease in germfree animals.** — J.

infect. Dis. **108,** 12-18. [Authors' summary modified.] **3045**

After 3 years' experimentation with germ-free g.pigs, a disease of unknown aetiology appeared spontaneously and involved every animal obtained from 66 consecutive caesarian sections during 10 months. Most of the animals developed symptoms between the 10th and 14th day of age and all died. Histological examination revealed that primary bronchopneumonia was the cause of death. Efforts to prevent the disease by nutritional, chemotherapeutic and immunization procedures failed. The development of the disease in germ-free animals appeared to be prevented by feeding autoclaved caecal content from conventional animals. Eventually the donor animals for the caesarian sections were obtained from a new colony and there was no recurrence of the disease. Although the aetiology was unknown, there was reasonable evidence for seriously considering the presence of a disease agent, such as a virus, which was undetectable by the usual routine methods.

Skold, B. H. (1961). **Chronic arteritis in the laboratory rat.**—J. Amer. vet. med. Ass. **138,** 204-207. [Author's summary modified.] **3046**

Vascular lesions involving the small muscular arteries, chiefly of the mesentery and kidney, were observed in 47 of 108 laboratory rats. They occurred in older rats and resembled those of periarteritis nodosa in man. Both the early and late stages of the vascular lesions were observed, frequently in the same rat.

Żuliński, T. (1961). Samoistna arterioskleroza naczyń sercowych u kur. **[Spontaneous cardiac arteriosclerosis in fowls.]** — Med. Wet., Warszawa **17,** 76-80. [In Polish.] **3047**

Hearts of 32 hens (1–2 years old) were examined and lesions found in 4 out of 10 Sussex, 3 out of 10 Polish Karmazyn breed and 3 out of 10 crossbreds. The pulmonary and coronary arteries were mainly affected and the lesions consisted of hypertrophy of the tunica intima extending to the media and leading to hyaline degeneration.—M. Gitter.

Rigdon, R. H. (1961). **Muscular dystrophy: spontaneous occurrence in ducks.**—Tex. Rep. Biol. Med. **19,** 167-177. [Author's summary modified.] **3048**

Clinical and pathological changes were described in Pekin ducks, kept under laboratory conditions, which had "malformed" extremities. The abnormality was considered to be a contracture resulting from focal necrosis in striated muscles. One or two ducklings in each batch of 25 or 50 were affected. Aetiology was not yet known.

Andersen, A. C. (1961). **Effects of ionizing radiations and diagnostic problems.** — Proc. 64th Ann. Meet. U.S. Livestock Sanit. Ass., Charleston, 1960 pp. 364-380. [Author's summary and conclusions modified.] **3049**

Examples of radiation damage illustrated the wide range of biochemical responses in mammals to ionizing radiations. Different sources and types of radiations, dosage factors, species, and individual differences make it necessary to detect the source of exposure before a diagnosis of radiation damage can be made. Familiarity with the characteristics of radiation syndromes merely offers a means of tentative diagnosis of radiation damage.

It is generally agreed that ionizing radiations are always harmful, yet radiation damage is largely assessed by morphological criteria. Diagnostic tests similar to those commonly employed in medicine have not been developed to detect a biological response to ionizing radiation. Sensitive instruments are available to detect the source of radiation, but, by comparison the methods available for detecting radiation damage are only crude.

Kartashov, P. A. (1961). **[Radio-active isotopes and ionizing radiation in veterinary science.]** —Vestn. sel'skokhoz. Nauki No. 3 pp. 70-74. [In Russian. Summaries in English, French and German.] **3050**

This review contains little new information. There is brief reference to work by E. A. Nesterova & others on the metabolism of radio-iodine in sheep, and by Y. I. Raetskaya on the incorporation into vitamin B_{12} of radiocobalt fed to sheep in a mineral supplement. P. A. and V. M. Kartashov studied the metabolism and excretion of labelled DDT and BHC in cows dressed with these parasiticides. They found that radioactivity in milk persisted for 4·5 months after a dressing with labelled DDT and 10 weeks after BHC. References to the literature are not provided.—R.M.

Il'in, V. G. (1961). **[Safety of milk and meat from cows contaminated with radio-active iodine.]**—Veterinariya, Moscow No. 3 pp. 69-70. [In Russian.] **3051**

A soln. of I^{131} (as sodium iodide) having a specific activity of 0·399 microcuries/ml. was

given by mouth to one cow aged 3 years at 5·45 microcuries/kg. body wt. and to another cow aged 4 years at 6·11 microcuries/kg. Milk samples were examined twice daily until 23 days after administration, when the cows were killed in order to test the organs for radio-activity. Radio-activity of milk was highest 6 hours after administration; 89–90% of the total radio-activity was excreted during the first 4 days. The thyroid gland contained 87% of the total radio-activity remaining in the body. Milk was regarded as unfit for human consumption for 3 weeks after ingestion of radio-iodine but such milk could be used to make cheese and other products. The thyroid gland should be removed from contaminated carcasses and the carcasses kept in cold store until no radio-activity is detectable.—R.M..

Badman, H. G. & Brown, W. O. (1961). **The determination of ^{14}C and ^{32}P in animal tissue and blood fractions by the liquid-scintillation method.**—Analyst **86,** 342-347. **3052**

The method was tested on blood serum and oviduct tissue of fowls injected i/p with one of the two isotopes 12 hours previously. —R.M.

I. Downes, A. M. (1961). **On the mechanism of incorporation of [^{35}S] cystine into wool.**—Aust. J. biol. Sci. **14,** 109-119. [Author's summary.] **3053**

II. Downes, A. M. & Lyne, A. G. (1961). **Studies on the rate of wool growth using [^{35}S] cystine.** — Ibid. 120-130. [Part of authors' summary.] **3054**

I. A comparison was made of the rate of incorporation of ^{35}S into the plasma proteins and the wool of a sheep after an intravenous injection of DL-[^{35}S] cystine. The cystine of wool attained a much higher specific activity than that of the plasma proteins, suggesting that cystine is not incorporated into wool by any process involving a direct modification of the plasma proteins. It is also suggested that there is a metabolic "pool" of material containing cystine associated with the wool follicles themselves which is turned over with a half-time of about 3 days.

II. The radioautographic method was used to study the length growth rate of wool fibres in a sheep subjected to changing nutritional conditions. A Corriedale wether was given nine i/v doses of DL-[^{35}S] cystine at intervals of 4 days. When the daily food intake was increased from 800 g. to about 1,300 g., the absolute increase in length growth rate was similar for all fibres. When the level of nutrition was reduced to 300 g. per day the length growth rate decreased in proportion to the initial rate. Although the changes in volume were approximately proportional to the initial growth rate, a differential rate of response in the largest and smallest fibres was observed. Thus the length and diameter components of volume responded independently to the nutritional changes. Clipping alone had little or no effect on the rate of wool growth when changes in skin temperature were reduced to a minimum. The sensitivity of the radioautographic technique was discussed.

Todd, F. A. (1961). **Defense against biological warfare on livestock.**—Proc. 64th Ann. Meet. U.S. Livestock Sanit. Ass., Charleston, 1960 pp. 70-80. [Author's summary modified.] **3055**

The importance of food and other agricultural resources required during a national emergency was discussed. Information on the vulnerability of the livestock of the U.S.A. to biological warfare is given. Examples were given of past outbreaks of serious foreign animal diseases and the losses that resulted. The defence and protective measures now in force at the borders and all ports of entry were discussed. The State-Federal Emergency Animal Disease Eradication Organization and operational procedures were briefly summarized.

Uvarov, O. (1961). **Recent advances in the treatment of skin diseases with special reference to griseofulvin.**—Vet. Rec. **73,** 258-262. [Author's summary modified.] **3056**

This paper deals with some of the common skin diseases and some drugs used in their treatment are described, with special reference to griseofulvin. Preliminary results with griseofulvin indicated that it can be of value in the treatment of ringworm in animals at an average daily dose of 40 mg. per kg., but duration of treatment depends on the species. There were no side effects throughout these trials.

Kroll, H. T. (1961). Leberfunktionsproben bei normal- und eiweissmangelernährten Schweinen nach Zimmer. **[Zimmer's two-dye method as a test for liver function in normal and protein-deficient pigs.]** — Inaug. Diss., Hanover pp. 59. **3057**

The two-dye test of Zimmer (1956) was performed on 17 normally fed pigs and 13 pigs fed rations deficient in protein, from the age

when they weighed 40 kg. until they reached slaughter weight (110 kg.) or for up to a year. They were injected i/v with 150 mg. of bromsulphalein and 50 mg. of trypan red, and blood was taken for analysis after 5, 10, and 15 min. Because of the very rapid excretion of bromsulphalein by the pig (91·3% within 5 min. in healthy animals) and extra-hepatic influences, it was considered that the test is not entirely suitable for this animal.—M.G.G.

POISONS AND POISONING

Manz, D. (1961). Histologische Untersuchungen über die Osteogenese am Klauenbein des Rindes im Hinblick auf die osteomalazieähnlichen Veränderungen bei der Fluorvergiftung. **[Histology of bone formation in the third phalanx of cattle, with reference to the bone lesions of fluorine poisoning.]**—Inaug. Diss., Hanover pp. 48. **3058**

From examination of 32 cattle of different ages it was concluded that at no stage of normal osteogenesis in the third phalanx could the process be confused with the osteomalacia-like picture of fluorine poisoning.—E.G.

Ernst, M. R., Klesmer, R., Huebner, R. A. & Martin, J. E. (1961). **Susceptibility of cats to phenol.** — J. Amer. vet. med. Ass. **138,** 197-199. [Authors' summary modified.] **3059**

Twenty-one cats weighing on average 9 lb. were given i/v and s/c doses of phenol in a 0·5% solution. I/v doses of 20 to 70 mg. caused increased respiratory rates and convulsions; 80 mg. appeared to be the lethal dose. Single s/c doses up to 60 mg. induced transient inappetence and diarrhoea. Three consecutive daily doses of 30 mg. killed one of 3 cats. The i/v toxic dose ranged from approx. 2·2 to 7·7 mg./lb. body wt. The lethal dose approximated 8·8 mg./lb.

Reliable information on the toxic doses of phenol by hypodermic injection in various species of animals is lacking. But it appears that the presupposed toxicity of phenol for cats may be related to this species' habit of licking the medicated body surface rather than to unusual drug sensitivity.

I. Shone, D. K. (1961). **Toxicity of the Jack Bean.**—Rhod. agric. J. **58,** 18-20. **3060**

II. Affleck, H. (1961). **Jack Bean poisoning in cattle.**—Ibid. **58,** 21. **3061**

I. In a trial with 3 cows, it was established that 1 oz. of ripe *Canavalia ensiformis* seed per 1·62 lb. body wt. given over 3 days was lethal. The chief symptoms were severe diarrhoea, weakness, inability to eat or drink, and stiffness of the hindquarters. The chief P.M. findings were dehydration, severe mucoid enteritis, nephritis and emphysema of the lungs. It was recommended that Jack Bean meal should not exceed 30% of the total feed of cattle, or that it should be heated.

II. Two outbreaks of poisoning in cattle grazing *C. ensiformis* were reported. The symptoms included lameness in the hind legs, muddy discoloration of the mucous membranes, and prostration. P.M. examination of one animal revealed impaction of the omasum, oedema and discoloration of the mesenteric lymph nodes, centrilobular necrosis of the liver, necrotic ulcers in the gall bladder, and hyperaemia of the kidney medulla.

—M.G.G.

van der Hammen, H. J. (1961). Een praktijkgeval van aldrinvergiftiging bij biggen. **[Aldrin poisoning in a litter of piglets.]** — Tijdschr. Diergeneesk. **86,** 197-199. [In Dutch. Summary in English.] **3062**

It appeared that a packet of Aldrin powder had fallen off a shelf into the sty. Four of ten piglets died, three of them a week after the incident (after apparent recovery).—R.M.

Johnsen, R. E., Dahm, P. A., Fairchild, M. L. & Freeman, A. E. (1961). **Endrin residues on corn stover in relation to dairy cattle feeding.**—J. econ. Ent. **54,** 398-399. **3063**

A 4·4-acre field of maize was treated with endrin at the rate of 0·25 lb. per acre when the maize was in the late whorl stage. After harvesting, 3 cows were allowed to graze in this field for 38 days. No endrin was detected in their milk.—M.G.G.

Gladenko, I. N. & Prostyakov, A. P. (1961). **[Determination of hexachlorane in material of animal or plant origin.]** — Veterinariya, Moscow No. 2 pp. 83-86. [In Russian.] **3064**

Hexachlorane is benzene hexachloride. The authors' method was based on attachment of the chlorine in BHC to zinc to form zinc chloride. They tried it on organs and tissues of g.pigs and rabbits killed at different intervals (up to 60 days) after oral administration.—R.M.

Buck, W. B., Binns, W., James, L. & Williams, M. C. (1961). **Results of feeding of herbicide-**

treated plants to calves and sheep.—J. Amer. vet. med. Ass. **138,** 320-323. [Authors' summary modified.] **3065**

Plots of Canadian thistle (*Cirsium arvense*) were sprayed with 2, 4-D (propylene glycol butyl ether ester of 2, 4-dichlorophenoxyacetic acid) at 2 lb. per acre. Tall larkspur (*Delphinium barbeyi*) was sprayed with Silvex (propylene glycol butyl ether ester of 2-(2, 4, 5-trichlorophenoxy) propionic acid) at 8 lb. per acre, and sneezeweed (*Helenium hoopesii*) with 3 lb. of Silvex or 4 lb. of 2, 4-D per acre.

Collections at various times following the applications were dried (except for one thistle-feeding trial that utilized the green plant), ground, and fed to 4- and 5-month-old calves and adult sheep through rumen fistulas.

There was no indication that the application of the herbicides altered the plant's toxicity for calves and sheep. Canadian thistle, ordinarily a non-toxic plant, did not produce toxic effects in calves and sheep, after being sprayed with 2, 4-D. Treated and non-treated larkspur and sneezeweed poisoned both calves and sheep, but there were no clinical differences between those animals fed treated and non-treated plants.

Anon. (1961). **The deaths of birds and mammals connected with toxic chemicals in the first half of 1960. Report No. 1. of the B. T. O. — R. S. P. B. Committee on toxic chemicals.** pp. 20. London: The Royal Society for the Protection of Birds. **3066**

Of 67 incidents in which a number of birds and mammals died, 59 were attributed to seed dressings and 8 to crop sprays. Deaths occurred in 33 species of birds and 6 species of mammals in 23 counties of England, Scotland and Wales. Symptoms included loss of balance, gasping, and swelling and bleeding of the eyeballs. P.M. there were pronounced petechiae and ecchymoses in the intestines. Organic chlorine (9–36 p.p.m.) and mercury (2·2–18·3 p.p.m.) were detected in the organs of 6 birds sent for analysis. Other organizations studying this problem reported dieldrin, mercury, and chlorinated hydrocarbons in dead birds. The victims included many insectivorous birds, carnivores, and some dogs and cats. It was concluded that immediate steps should be taken to prevent irreparable damage to wild life.—M.G.G.

PHARMACOLOGY AND GENERAL THERAPEUTICS

(For treatment of specific infections see under the appropriate disease)

Kienel, G. (1961). Toxizität und Wirkung einer Kobalt-Eisen-Kombination. **[Toxicity and action of a combination of cobalt and iron, bound to an amino acid, in guinea-pigs.]** —Arzneimittelforsch. **11,** 296-302. [Summary in English.] **3067**

The toxicity of i/m injected bivalent Cu and Fe bound to an amino acid was much less than that of a mixture of cobalt chloride and ferrous sulphate.—R.M.

Brüggemann, J., Bronsch, K., Niesar, K.-H., Schole, J. & Barth, K. (1961). Zur Frage der gesundheitlichen Unbedenklichkeit von Nitrofurazon, Nitrophenid und Nicarbazin in Geflügelmischfuttern. **[Innocuity of nitrofurazone, nitrophenide and nicarbazin in mixed meals for poultry.]**—Zbl. VetMed. **8,** 123-149. [Summaries in English, French and Spanish.] **3068**

Therapeutic doses of nitrofurazone, nitrophenide and nicarbazin in poultry meal were well tolerated by 230 chicks five days old and 140 young fowls weighing about 1·1 kg. Amounts of five times the therapeutic dose and higher, produced considerable metabolic disorders. Details are given of the clin. picture and pathology of poisoning with these drugs which, even after overdosage, it was impossible to demonstrate in the tissues.—E.G.

Sackmann, W. & Kradolfer, F. (1961). Antibakterielles Spektrum und Beeinflussung der Darmflora von Ratten durch Jodchloroxychinolin, Phenanthrolinchinon und deren Kombination (Mexaform). **[Iodochlorhydroxyquinoline (Vioform) and phenanthroline quinone (Entobex): their action alone and combined on bacteria and on the intestinal flora of rats.]**—Zbl. Bakt. I. (Orig.) **181,** 539-550. [Summaries in English, French, Spanish and Russian.] **3069**

The bacteriostatic effect *in vitro* of Mexaform, a preparation consisting of 10 parts of iodochlorhydroxyquinoline and one part of phenanthroline quinone, was about equivalent to that of iodochlorhydroxyquinoline alone. With regard to its bactericidal effect, however, both components acted synergically against *Salmonella typhi, Shigella*

sonnei, Staphylococcus aureus, Streptococcus pyogenes and *Candida albicans*. Following a temporary reduction in the intestinal flora in rats, about 12 hours after oral dosage with the compound, the coliform flora began to increase. This was probably due to the elimination of the more sensitive organisms. —E.G.

Fitzpatrick, R. J. (1961). **Hormones new and old.**—Vet. Rec. **73,** 111-118. **3070**

This is a review of the physiological and pharmacological aspects of steroid hormones, including synthetic and semi-synthetic substances with structure and action closely related to those occurring naturally.

—Joyce E. Hammant.

Kiser, J. S. (1961). **Increasing the effectiveness of antibiotics as chemotherapeutic agents.**—Antibiot. & Chemother. **11,** 261-266. [Summary in Spanish p. 298. Author's summary modified.] **3071**

Chlortetracycline, at 200, 400 or 800 g. per ton of a broiler feed low in calcium (0·21% Ca), produced significantly higher blood concentrations and proportionally longer survival time in chicks experimentally infected with *Salmonella gallinarum* than the same levels of chlortetracycline in a broiler feed containing a usual level of calcium (1·33%).

Effenberger, E. & Seeliger, H. P. R. (1961). Die toxische Wirkung des Penicillins und anderer antibiotischer Mittel auf Meerschweinchen. **[Toxic action of penicillin and other antibiotics on guinea-pigs.]** — Arzneimittelforsch. **11,** 38-41. [Summary in English.] **3072**

The authors believed that the high toxicity of penicillin or bacitracin for g.pigs was due to severe intoxication caused by sudden change in intestinal flora, and not primary brain damage.—R.M.

Fisher, E. W. (1961). **Observations on the disturbance of respiration of cattle, horses, sheep, and dogs caused by halothane anesthesia and the changes taking place in plasma pH and plasma CO_2 content.**—Amer. J. vet. Res. **22,** 279-286. [Author's summary modified.] **3073**

The effects of halothane anaesthesia on the plasma pH, the plasma CO_2 content, and the ventilation rate were studied principally in cattle, but also in horses, sheep and dogs. The anaesthetic caused a depression of the ventilation rate in all the species and, concomitant to this, a respiratory acidosis occurred. Removal of the animal from the anaesthetic atmosphere produced rapid return of ventilation rate to normal as a consequence of a recovery from the respiratory acidosis.

See also abstr. **2805** (swine dysentery); **2830** (ethidium bromide in ovine conjunctivo-keratitis); **2836** (furazolidone in S. typhi-murium infection in foals); **2884** (iturine and chinosol against ringworm in horses); **2889** (suramin); **2890** (trypanosomiasis in camels); **2893-2894** (histomoniasis in turkeys); **2897** (coccidiosis); **2971-2972, 2974-2978 & 2981** (parasiticides); **2988-2993, 2995 & 3003** (anthelmintics); **3056** (griseofulvin); **3062** (aldrin poisoning in piglets); **3064** (BHC in material of animal and vegetable origin); **3066** (deaths in birds due to toxic chemicals).

PHYSIOLOGY, ANATOMY AND BIOCHEMISTRY

Symington, R. B. (1961). **Studies on the adaptability of three breeds of sheep to a tropical environment modified by altitude. V. The annual fluctuation in breeding ability of rams maintained on Rhodesian highveld. VI. The effect of increased light and injections of vitamin A on semen production and sperm characteristics in tropical rams. VII. Sexual activity in relation to age of ram.**—J. agric. Sci. **56,** 165-171; 173-177 & 179-181. [Author's summaries modified.] **3074**

I. Semen characteristics and libido were observed for 34 months in German Merino, Persian Blackhead and indigenous 'Native' rams maintained on Rhodesian highveld. Birth rate from controlled service was determined during 23 of these months.

Breeding ability, as judged by semen production and libido, was continuous in all rams. A fluctuation in birth rate from controlled service was due more likely to seasonal variation in female fertility than in seminal fertilizing capacity.

Monthly changes occurred in all seminal characteristics but only those in spermatozoa concentration were consistent between years. In each breed spermatogenic activity was high in spring and midsummer, low in late summer and autumn.

Thermoregulation was always adequate to prevent 'summer sterility'.

Breeds differed in all ejaculate characteristics and particularly between wool and hair breeds. Merino semen resembled that of other wool breeds whereas in hair breeds quantitative semen characteristics tended to be smaller than those of average size wool breeds.

II. Rams of the same 3 breeds were exposed to gradually increasing day-length

simulated by use of electric light in the night pen. Between February and June experimental day-length increased from 14 hr. 35 min. to 17 hr. whereas natural day-length fell from 13 hr. 50 min. to 12 hour. An additional trial was superimposed to determine the effect of vitamin A injections on reproductive function and on ability to respond to photoperiodic stimuli.

Merino and Native rams were unaffected by additional light and their semen improved during the experiment. Persian semen and particularly spermatozoa concentration appeared to be affected adversely by light treatment. Results from a changeover in treatment of Persian and Native rams supported these conclusions.

Injections of vitamin A had no effect on semen characteristics or on response to light treatment.

III. The effect of age on attainment of puberty and on seminal characteristics in yearling and mature rams of these 3 breeds living on Rhodesian highveld was studied.

Puberty occurred at age and live weight proportional to mature live weight. Well-grown Native lambs ejaculated first at 169 days of age and 46 lb. live weight; Merino lambs when 250 days old and 79 lb. live weight; Persians were intermediate. Onset of sexual maturity was related more closely to live weight than to age, since runts ejaculated first at live weights close to those of well-grown lambs.

Seminal fertilizing capacity improved rapidly from puberty and fully mature reproductive ability occurred in Native rams at 12 months, and in Merino and Persian rams at 2 years of age.

Cresswell, E. (1961). **Note on the effect of shearing, and of drenching with simulated rain, on the oxygen consumption and respiratory pattern of sheep.**—Emp. J. exp. Agric. **29**, 162-164. [Author's summary modified.] **3075**

In Romney Marsh and Cheviot ewes, shearing resulted in a two-thirds reduction in the respiration rate and a large increase in the depth of breathing. A three-minute spraying with simulated rain reduced the respiration rate and increased the depth of breathing and the oxygen consumption of ewes which had recently cast their fleece or had been shorn.

Chowdhury, D. R. & Sadhu, D. P. (1961). **Rate of evaporation from different regions of the skin of Indian zebu cattle.** — Nature, Lond. **189**, 491. **3076**

Indian zebu cattle have a marked hump and a voluminous dewlap and navel flap, particularly in areas with oppressive summer heat. Study showed that the effective secreting surface of the hump was higher than elsewhere because of a greater concentration of sweat glands. The rate of evaporation of sweat from various skin surfaces was estimated using, as an index, the rate of decolorization of cobalt chloride anhydride paper disks. Evaporation from the skin of the hump and neck was greater than from other parts of the body, and it was suggested that these regions had developed special thermoregulatory significance.—Joyce E. Hammant.

Bligh, J. (1961). **The synchronous discharge of apocrine sweat glands of the Welsh mountain sheep.**—Nature, Lond. **189**, 582-583. **3077**

Thermocouples, attached to the skin beneath the fleece, showed occasional and brief simultaneous increases in temperature which exceeded both ambient and deep body temperatures. The reaction was thought to be due to simultaneous discharge of fluid from the apocrine glands, one of which is associated with each wool follicle, and the uptake of water by wool as an exothermic reaction. No association of this discharge with a thermoregulatory mechanism was found and it was suggested that the reaction was one characteristic of a primitive type of gland with no special function.—Joyce E. Hammant.

Essler, W. O. & Folk, G. E., Jr. (1961). **Determination of physiological rhythms of unrestrained animals by radio telemetry.** — Nature, Lond. **190**, 90-91. **3078**

Transmitters were constructed to relay measurements in unrestrained animals to a distant observer. The transmitter, powered by a small long-life battery, contained a basic oscillator which was frequency modulated by a voltage proportional to the phenomenon to be measured and was carried on a harness or implanted subcutaneously, hermetically sealed. Heart-rate 24-hour rhythms were obtained in a dog, cat, rabbit and man. The lowest heart-rate in man occurred at 3 a.m., in the dog at 5 a.m., in the cat at 6 a.m. and in the rabbit at 8 a.m. Simultaneous temperature and heart-rate measurements in a dog indicated a close correlation between the two.

—A. Ackroyd.

Chew, R. M. (1961). **Water metabolism of desert-inhabiting vertebrates.**—Biol. Rev. **36,** 1-31. **3079**

This is a review of the existing literature, covering investigations on amphibia, reptiles, birds and mammals. Gaps in the studies are pointed out and suggested as lines for further research.—Joyce E. Hammant.

Rendel, J. (1961). **Relationships between blood groups and the fat percentage of the milk in cattle.**—Nature, Lond. **189,** 408-409. **3080**

Data were obtained from records kept since 1955, of the fat content of the milk of the first lactation from daughters sired through A.I. by bulls of known blood group. For each of the blood groups studied, the bulls were divided into 2 groups, those possessing and those lacking the group studied. For the Swedish Red and White breed, 205 bulls were studied, each having between 10–41 daughters; for the Swedish Friesian breed, 77 bulls each with 10–37 daughters. It was found in both breeds that the allele $B^{BO, YDI}$ had a strong positive influence on the fat percentage, similarly the offspring from sires possessing the J gene produced milk with a higher butterfat content. No cumulative effect of these 2 factors was found. Conflicting results were obtained on studying the effect of the L gene; only in the Friesian breed was it associated with a significantly higher fat content.

—Joyce E. Hammant.

Howes, J. R., Davis, G. K., Loggins, P. E. & Hentges, J. F. (1961). **Blood potassium and sodium of Hereford and Brahman cattle and some breeds of sheep maintained in Florida.** —Nature, Lond. **190,** 181-182. **3081**

Flame spectrophotometry showed that Herefords had a higher K and a lower Na content in their erythrocytes than the Brahmans. The data confirmed the bovine erythrocyte characteristic of a low K and high Na content. In ewes, the erythrocytes of Hampshire and Florida natives had a high K content whilst in those of Rambouillets it was low. The incidence of high K blood types amongst Florida native sheep closely resembled that in Cheviots from which they are believed to be descended.—A. Ackroyd.

Fisher, E. W. & Dalton, R. G. (1961). **Determination of the cardiac output of cattle and horses by the injection method.**—Brit. vet. J. **117,** 143-151. [Authors' summary modified.] **3082**

Using an injection technique, which is described, the authors estimated cardiac output in 29 adult cattle (mean value 113 ml./kg. body wt./min.) and in 14 adult horses (mean value 75 ml./kg. body wt./min.). Comparisons are made with estimates made by other authors in these and in other species of domestic animals and in man.

Clarkson, M. J. (1961). **Bromsulphthalein liver clearance in the bird. 1. The relationship between plasma levels and bile and liver content in the turkey.**—Res. vet. Sci. **2,** 143-148. [Author's summary.] **3083**

The plasma and bile BSP contents were determined in anaesthetized turkeys after a single intravenous injection of BSP.

It was shown that the rate of transfer of BSP between blood, liver and bile can be predicted from a graph of the fall in plasma BSP alone, this having already been demonstrated in the dog (Richards, Tindall & Young, 1959).

This information can readily be obtained on the normal unanaesthetized turkey and it is believed that this will prove a useful technique in the study of the avian liver.

Bath, I. H. & Head, M. J. (1961). **The in vitro production, by rumen micro-organisms, of volatile fatty acids from cellulose and hemicellulose labelled with ^{14}C.**—J. agric. Sci. **56,** 131-136. [Authors' summary modified.] **3084**

Fermentation of hemicellulose and alpha-cellulose was studied by a new technique, using ^{14}C-labelled carbohydrates fermented in the presence of normal herbage material in an artificial rumen.

A method of growing grass in an atmosphere of $^{14}CO_2$, its fractionation into hemicellulose and alpha-cellulose and the analysis of the labelled end-products (volatile fatty acids) are described.

Using these techniques it was shown that both hemicellulose and alpha-cellulose give rise to acetic and propionic acids in the molar ratio of approx. 2 : 1. Labelled butyric, valeric and caproic acids were present in only small amounts compared with acetic and propionic acids.

Koch, W. (1961). Weinen als Ausdruck von Angst beim Rind. **[Lacrimation as an expression of fear in cattle.]** — Berl. Münch. tierärztl. Wschr. **74,** 113. **3085**

During collection of blood samples from 42 bulls, lacrimation was observed in 24, thirteen of which had frequent micturition and defaecation and general agitation. Lacrima-

tion associated with pain or fear appeared to be more frequent in old than in young bulls. —E.G.

Hare, W. C. D. (1961). Zur Ossifikation und Vereinigung der Wirbelepiphysen beim Hund. **[Ossification and union of vertebral epiphyses in the dog.]** — Wien. tierärztl. Mschr. **48,** 210-215. [English summary modified.] **3086**

Dogs were X-rayed to determine the age at which the ossification centres for the epiphyses of the vertebrae appear, and the age at which the epiphyses unite with the main part of the vertebral body was determined from the X-ray plates and by examination of vertebrae.

The age at which the ossification centres appear is subject to individual and breed variations, but in general they appear from the second to the 8th week after birth. The time of epiphyseal union also varies, but union is usually complete by the 14th month.

The epiphyses do not appear to unite in all regions of the vertebral column simultaneously: the cranial epiphysis of a vertebra appears and unites before the caudal epiphysis, and the cranial and caudal epiphyses appear and unite throughout the column in a certain chronological order.

Abdel-Raouf, M. (1961). **The proliferation of germ cells in the testes of bull calves and young bulls.**—Acta vet. scand. **2,** 22-31. [In English. Summaries in German and Swedish. Author's summary modified.] **3087**

The epithelium of the spermatic cords and the seminiferous tubules is described from the foetal state to maturity. The basal supporting cells proliferated actively at and soon after birth, but division ceased at 16 weeks. Some of the new cells were located towards the centre of the spermatic cords at four weeks. At 28 weeks some and at 44 weeks all of the supporting cells, which never give rise to spermatogonia, had become transformed to typical Sertoli cells.

Many gonocytes show degenerative changes shortly after birth. The gonocytes which do not degenerate, proliferate from the eighth week and give rise to spermatogonia. Spermatogonia increase in number and at 20 weeks primary spermatocytes are produced. Spermatids and spermatozoa appear at 28 weeks.

Morton, W. R. M. (1961). **Observations on the full-term foetal membranes of three members of the Camelidae (Camelus dromedarius, Camelus bactrianus and Lama glama).** — J. Anat., Lond. **95,** 200-209. **3088**

M. described the anatomy and histology of full-term foetal chorions of a dromedary, a Bactrian camel and a llama. There are five plates of illustrations.—R.M.

Lewis, D. (1961). **The absorption of subcutaneously implanted thyroxine in the sheep.** —J. agric. Sci. **56,** 65-67. [Author's summary modified.] **3089**

Pellets of L-thyroxine (30 mg.) were implanted subcutaneously in sheep. The loss in weight of the implants and the plasma protein-bound iodine (P.B.I.) level were determined at intervals.

The P.B.I. concentration increased within a few days from a normal value of around 5 μg./100 ml. to one of 15–20 μg./100 ml. After 10–20 days the conc. slowly returned to normal, and at 70 days was only slightly above the normal level.

Within 4 weeks about 30% of the implant was absorbed; the pellet remained reasonably constant in weight thereafter.

Hill, C. H., Warren, M. K. & Garren, H. W. (1961). **Blood citric acid concentration as affected by heat and cold stress and adrenocorticotrophic hormone.**—Poult. Sci. **40,** 422-424. [Authors' summary.] **3090**

The blood citric acid concentration of chicks exposed to either high or low temperatures is increased. The administration of ACTH also increases the citric acid concentration. These findings are discussed in relation to their possible importance in disease resistance.

Steinhoff, G. (1961). Untersuchungen der Alkalireserve beim Schwein. **[The alkali reserve in blood plasma of pigs.]** — Inaug. Diss., Hanover pp. 49. **3091**

The alkali reserve of venous blood plasma averaged 43 vol.% CO_2 in 72 normal pigs weighing 20–60 kg., 50 vol.% in 15 normal pigs weighing 70–350 kg., 44 in 33 runt pigs, 45 in 21 pigs with various diseases, 50 in 23 pigs that had undergone a surgical operation 2–5 days previously, and 42·75 in 27 sows that had undergone caesarian section 2–5 days previously.—M.G.G.

van Koetsveld, E. E. & Maas, H. J. L. (1961). De gehalten van eieren en ééndagskuikens aan enkele macro- en micro-elementen. **[The contents of minerals and trace elements in**

eggs and day-old chicks.] — Tijdschr. Diergeneesk. **86,** 477-490. [In Dutch. Summaries in English, French and German.] 3092

Dried egg components and whole chicks of two breeds (a laying breed and a table breed) were analysed for copper, manganese, iron, zinc as well as calcium, magnesium and phophorus. The results, shown in seven tables (having Dutch and English captions) were compared with data given in "The avian egg" by Romanoff & Romanoff (1949).—R.M.

Irving, E. A. & Watts, P. S. (1961). **Estimation of calcium and magnesium in blood serum by the cathode-ray polarograph.** — Biochem. J. **79,** 429-432. [Authors' summary modified.] 3093

By the polarographic method, the total Ca and Mg is determined first and then the Mg alone. Ca concentration is found by difference. This method was as accurate as and faster than chemical procedures. It was checked by analysis of 20 replicates each of one sheep and one ox serum; it was then applied to sera from 50 cattle and 50 sheep. No result differed significantly from that obtained by chemical methods though the polarographic estimates of calcium tended to be slightly higher.

Wasserman, R. H., Kallfelz, F. A. & Comar, C. L. (1961). **Active transport of calcium by rat duodenum in vivo.** — Science **133,** 883-884. [Authors' summary.] 3094

In studies of the living rat, it was observed that ionic calcium is transferred against a concentration gradient and an electropotential gradient by the duodenal membrane; this would constitute evidence for the active transport of calcium in intestinal absorption and corroborates earlier observations made *in vitro*. The significance of this process in regard to total calcium absorption is unknown at present.

See also absts. **3120** (physiology of reproduction); **3121** (control of ovulation).

PUBLIC HEALTH, VETERINARY SERVICES AND VETERINARY EDUCATION

See absts. **2824** (Pasteurella in milk); **2837** (human salmonellosis associated with infection in calves); **2842** (salmonella in a poultry processing plant); **2843-2850** (Br. abortus in milk); **2900** (toxoplasmosis); **2909** (survival of F. & M. disease virus in meat); **2912** (rabies diagnosis).

REPRODUCTION AND REPRODUCTIVE DISORDERS

First, N. L., Henneman, H. A., Magee, W. T. & Williams, J. A. (1961). **The frozen storage of ram semen.** — J. Anim. Sci. **20,** 74-78. [Authors' summary modified.] 3095

Mean survival of spermatozoa after freezing with 0, 2, 4, 6, 8, 10, 12 and 15% glycerol was significantly greater at 6 and 8% glycerol than below 6% or above 10%. There was no significant difference in motility between levels of 6 to 8·5%.

More spermatozoa survived freezing with glycerol levels of 6 or 9% than with 12 or 15%. The addition of increasing quantities of egg yolk to a heated homogenized milk diluent appeared to decrease survival.

Frozen semen from two rams was periodically thawed and examined for motility during a 14-month period of −79°C. storage. Motility declined rapidly during the first two months of storage but changed very little thereafter.

Schindler, H. & Amir, D. (1961). **Longevity of ram sperm in various diluents and at different dilution rates.** — J. agric. Sci. **56,** 183-189. [Authors' summary modified.] 3096

The efficiency of various diluents and dilution rates in maintaining motility of ram spermatozoa during storage at 4°C. was determined by half-life periods and total survival times of the spermatozoa.

A yolk-glycine-citrate diluent was more efficient than yolk-fructose-phosphate, yolk-citrate, cow's milk and ewe's milk, with or without yolk. It has the advantage that the spermatozoon is clearly visible under the microscope, and no sedimentation of any component occurs.

A modified IVT diluent prolonged total life span of the spermatozoa, but caused a faster motility decline in the first part of the storage period.

A 1 : 3 as compared with a 1 : 30 dilution rate with yolk-glycine-citrate produced a lower pH and motility inhibition during storage; this was reversible by additions of fresh diluent. Similar results were obtained in a diluent containing lactate. Neither of these treatments further prolonged motility at 4°C. The inactivation caused by a 1 : 1 dilution ratio reduced life span.

Storing semen, diluted at 1 : 3, in a dialysis bag surrounded by the same diluent, prevented inactivation and rapid pH decline.

Motility was maintained at a rate almost equal to that of semen diluted 1 : 20. This method combines the advantages of a high dilution rate and concentrated suspension of spermatozoa.

Glover, T. D. (1961). **Disintegrated spermatozoa from the epididymis.**—Nature, Lond. **190,** 185-186. **3097**

Morphological examination under the phase contrast microscope of spermatozoa from the epididymis of various species (rabbit, bull, goat, dog and cat) showed that, although a proportion of spermatozoa from the vas deferens appeared to be degenerate, more degeneration was discernible in samples from the body of the epididymis. Degenerate forms were scarce in specimens from the tail of the epididymis. The differences were less marked in ruminants, in which the degree of disintegration was small.—A. Ackroyd.

Flegmatov, N. A. & Shipilov, V. S. (1961). **[Prophylaxis of retained placenta in high-yielding cows.]**—Veterinariya, Moscow No. 3 pp. 56-62. [In Russian.] **3098**

On three farms over three years, 1,258 cows calved and 298 retained their placenta. Incidence was about the same month by month. Retention was associated with disturbance of mineral metabolism, revealed on X-ray plates by the rarefied appearance of the tail bones and by low blood calcium (8–10 mg./100 ml. in 3 cases). It was considered that the feeding of relatively large amounts of concentrates brought about acidosis, leading to lack of tone in the uterus. The correct feeding of pregnant cows was discussed. Whereas in ordinary cows (annual milk yield up to 3,000 kg.) the placenta was discharged within 4 hours of calving, in 90 high-yielding cows (over 5,000 kg. a year) it was discharged between 3 and 8 hours after calving. It was considered that manual removal of the placenta should be done not later than 24 hours after calving.—R.M.

Zimbelman, R. G., Loy, R. G. & Casida, L. E. (1961). **Variations in some biochemical and histological characteristics of bovine corpora lutea during early pregnancy.**—J. Anim. Sci. **20,** 99-105. **3099**

In one experiment the corpora lutea were studied from 6 unserved heifers at the 14th day of the oestrous cycle; from 14 days- and 42 days-pregnant heifers, 5 in each group; and from 9 heifers 28 days pregnant. Total progestogen content averaged 192 mg. per gland in the cyclic heifer, 323 mg. at 14 days of pregnancy, 148 at 28 days and 103 at 42 days. A second experiment was designed to study further the fall between 14 and 22 days; 5 animals each were used at each of the stages 18, 23 and 28 days pregnant and the decrease in progestogen content was found to be gradual over this 2-week period. Histologically the 14 and 18-day corpora had 45–70% functional type cells, whereas at later stages these cells did not exceed 15%. There were 25% more functional cells in cyclic than pregnancy corpora at 14 days, which might prove an important difference if confirmed by further work.—F. L. M. Dawson.

Zimbelman, R. G., Loy, R. G. & Casida, L. E. (1961). **Effect of exogenous progesterone on the bovine corpus luteum of early pregnancy.**—J. Anim. Sci. **20,** 106-108. **3100**

Progesterone (1 mg. per lb. body wt.) was injected into 9 heifers at the end of the fifth week of pregnancy and again a week and a fortnight later. After a further week they were slaughtered, with 10 controls, when 8 weeks pregnant. The exogenous progesterone did not affect the weight of the corpus luteum but decreased the progestogen content from 84 μg. per gland to 36 μg. Histologically very few functional cell types were recognizable in the corpora from either group.

—F. L. M. Dawson.

Meinecke, C. F. & McDonald, L. E. (1961). **The effects of exogenous testosterone on spermatogenesis of bulls.**—Amer. J. vet. Res. **22,** 209-216. [Authors' summary modified.] **3101**

Depression of semen quality and testicular size occurred in 4 bulls given 250 mg. of testosterone propionate 3 times a week for 18 weeks. Depression of all values, except testicular volume, continued for about 11 weeks after cessation of testosterone injections. Recovery then occurred, until semen quality values were slightly higher than before treatment. Biopsy showed that the decrease in testicular size was due to reduction in number and size of the germinal epithelium cells. The return of the testicles to normal size began when testosterone injections were discontinued. The testicles regained their normal size before the normal semen qualities were recovered.

Morris, T. R. & Nalbandov, A. V. (1961). **The induction of ovulation in starving pullets using mammalian and avian gonadotropins.**

—Endocrinology **68,** 687-697. [Authors' summary modified.] **3102**

Laying pullets deprived of all nourishment, except water and oyster-shell grit, showed ovarian degeneration and cessation of ovulation within 72 hours. Injections of gonadotrophins prevented ovarian degeneration and, in some cases, induced regular daily ovulations for 8 or more days after removal of food. With the limited range of doses investigated, intramuscular injections of dried chicken anterior pituitary gland were more effective in causing daily ovulations than was a combination of intramuscular injections of mammalian follicle stimulating hormone with intravenous injections of mammalian luteinizing hormone. The weight of yolks ovulated by starved, hormone-supported pullets declined progressively.

It is suggested that failure of the starved pullet to lay is primarily due to failure of the pituitary to secrete adequate gonadotrophins. The possibility that less extreme dietary deficiencies affect egg production by way of pituitary function is discussed briefly.

Archer, R. K. (1961). **True haemophilia (haemophilia A) in a Thoroughbred foal.**—Vet. Rec. **73,** 338-340. **3103**

The case described is believed to be the first of its kind to be recorded in a horse.

Sittmann, K., Rollins, W. C. & Kendrick, J. W. (1961). **A genetic analysis of the double cervix condition in cattle.** — J. Hered. **52,** 26-33. **3104**

High incidence of duplication of the cervix in two closely related Hereford herds, probably due to a single autosomal recessive gene with low penetrance, was described. The condition appeared to have little effect on fertility.—E.G.

Nisbet, D. I. & Renwick, C. C. (1961). **Congenital myopathy in lambs.**—J. comp. Path. **71,** 177-182. [Authors' conclusions.] **3105**

Flexed limb joints and inability to raise the head in Suffolk lambs at birth were due to a congenital myopathy, apparently originating shortly before birth. Most cases recovered within a few weeks, but in a few fibrous contractures of neck muscles caused permanent deformity of cervical and thoracic vertebrae. The cause of the myopathy is not known.

See also abstr. **2844-2863** (brucellosis); **2878** (vibriosis); **3018** (placental transfer of manganese in pigs); **3074** (sexual activity in relation to age in rams); **3087** (proliferation of germ cells in bull testes); **3088** (foetal membranes in camels and llamas); **3120** (physiology of reproduction); **3121** (control of ovulation).

ZOOTECHNY

Kotula, A. W., Drewniak, E. E. & Davis, L. L. (1961). **Experimentation with in-line carbon dioxide immobilization of chickens prior to slaughter.**—Poult. Sci. **40,** 213-216. [Authors' summary modified.] **3106**

The use of carbon dioxide for immobilization of chickens under commercial slaughtering conditions was demonstrated. During the tests, broilers were immobilized continuously in a conveyor equipped tunnel at the rate of 3,700 per hour. After emerging from the tunnel the chickens remained unconscious but alive during shackling, sticking and bleeding.

Huston, T. M. & May, K. N. (1961). **The use of sodium pentobarbital sedation as an aid in catching and plucking poultry.**—Poult. Sci. **40,** 434-440. [Authors' summary modified.] **3107**

Broiler chickens (aged 8–12 weeks) were used in trials to establish the oral dosage of sodium pentobarbitone necessary for sedation to facilitate dry plucking and to cause death. The sedative was administered in gelatin capsules. A dosage of one grain per lb. body weight produced anaesthesia and permitted satisfactory dry plucking without causing undue mortality.

A pelleted feed containing two, four, or six grammes of sodium pentobarbitone per lb. produced anaesthesia: the 6 g. level induced the deepest anaesthesia, effective for several hours. In 820 broilers, treated at this level and dry plucked in a commercial plant, feather removal was 90 to 95% complete and the bloom was excellent.

Sodium pentobarbitone did not influence the total amount of blood lost during a 2-min. bleeding time, although the rate of blood loss during bleeding appeared to be slower for treated birds.

Some residual drug was demonstrable in the tissues of treated birds making it unsafe to use until further work is done.

Thomas, W. D. (1961). **Chemical immobilization of wild animals.** — J. Amer. vet. med.

Ass. **138,** 263-265. [Author's summary modified.] **3108**

This report deals with the use of suxamethonium, in zoos and in the field, for immobilizing animals for examination or treatment. The drug is administered by a hypodermic syringe projectile fired from a carbon dioxide-powered rifle or pistol. Dosages and time of reaction for several wild animals of different weights are given.

Harker, K. W., Rollinson, D. H. L., Taylor, J. I., Gourlay, R. N. & Nunn, W. R. (1961). **Studies on the habits of zebu cattle. VI. The results on different pastures.**—J. agric. Sci. **56,** 137-141. [Authors' summary.] **3109**

The data collected during 26 days of cattle watching have been examined. Differences in the distribution of the habits, and of the length of time spent on each habit, larger than those recorded by other workers, are given. Possible explanations for these differences are discussed; part of the variations may have been caused by individual behaviour, and part by changes in climatic conditions. It is concluded that the major cause of variation is the difference between the herbage quantity and quality on the different pastures.

TECHNIQUE AND APPARATUS

Wallis, C., Lewis, R. T. & Melnick, J. L. (1961). **Preparation of kidney cell cultures.** — Tex. Rep. Biol. Med. **19,** 194-197. [Authors' summary modified.] **3110**

By using two modifications of the trypsinization procedure for preparing primary suspensions of tissue, cell suspensions were obtained in 60–80 min. and the cell yield was increased by 50%. They were the use of entire kidney without removing the pelvis, and the use of a more easily prepared and more active trypsin solution.

Kemp, J. G., Hunsaker, W. G. & Palmer, J. (1961). **Apparatus for simultaneous infusion and multiple blood sampling.** — Proc. Soc. exp. Biol., N.Y. **106,** 498-500. [Authors' summary.] **3111**

An infusion-withdrawal apparatus is described which eliminates the necessity for long cannulae between syringes and experimental animal and permits multiple infusion and withdrawal to be carried out simultaneously. Engineering plans are available from the senior author. [Canada Dept. of Agriculture, Research Branch, Ottawa.]

Rommel, P. & Rommel, W. (1960). Zur 24-Stunden-Urin-Sammlung beim geschlechtsreifen weiblichen Rind. [**Collection of 24-hour urine samples from adult cows.**]—Arch. exp. VetMed. **14,** 1281-1289. **3112**

The apparatus consisted of a funnel, made from supple material, kept in position by adjustable elasticized leather straps. The funnel is connected by tube to a receptacle for the urine.—E.G.

Waite, R. (1961). **A note on a method of overcoming the effect of udder disease or injury in experiments involving milk yield and composition.**—J. Dairy Sci. **28,** 75-79. [Author's summary modified.] **3113**

In experiments to determine the effect of feeding changes on milk yield and composition, udder disease or injury may easily invalidate the results. It is suggested that regular examination of the milk from each quarter of the udder would allow a diseased or injured quarter to be recognized and a true value for the effect of a feeding treatment to be obtained from the composition of the milk from at least two healthy quarters. Examples to illustrate the suggestion are given.

See also abstr. **2802** (sticky film method for detecting skin staphylococci); **2803** (selective differential medium for staphylococci); **2808** (phage-fluorescent antiphage staining system for B. anthracis); **2854** (brucella medium); **2873** (isolation of leptospira); **2892** (preservation of trypanosomes); **2952** (tissue culture); **2939** (whey in pig kidney tissue culture of Teschen disease virus).

REPORT

Bechuanaland Protectorate. (1958). **Annual Report of the Department of Veterinary Services for the year ended 31st December, 1957.** [Unsworth, K.] pp. 28+7 Appendices. **3114**

The outstanding event of the year was the outbreak of Foot and Mouth Disease. The cordon fences which had been erected to combat the disease before it could enter the Protectorate were not breached. The virus was typed by Pirbright at S.A.T.I. All cattle within the outbreak area (343,820) were inoculated with live virus. Concentrated inoculum was made of 10% suspension of vesicular fluid and epithelium in a solution of normal saline and glycerine. The virulent material was taken from lesions produced in

susceptible cattle by sub-mucosal inoculation of virus. The concentrated inoculum was prepared from 250 susceptible cattle on a fenced farm near Lobatsi. This was stored in a refrigerator until required. Diluent was prepared concurrently in a non-infected area and this was made by preparing a sterile solution of equal parts of glycerine and normal saline. This was stored for distribution in 250 ml. bottles to all districts in sufficient quantities for diluting the concentrated inoculum stored in refrigerators. Inoculum prepared and stored in this way was found to be viable after seven months.

Cattle received a dose of 1 ml. of a 1 : 500 suspension of virulent material in N/S glycerine solution. Cattle were not branded as in a previous operation branded cattle received lower bids from traders at the sales.

Reactions were up to 50% in areas where the disease had occurred before, to 90% in areas where the disease had not appeared. The whole of the staff was employed on the measures to prevent the spread of foot and mouth disease throughout the Protectorate.

Blackleg—238,150 doses of vaccine were issued. 1,730 cattle died of the disease.

Contagious Abortion—123,610 doses of vaccine were used. 5,038 abortions were reported but many of these are no doubt due to causes other than *Br. abortus.*

Rabies is enzootic in the northern areas of the Protectorate, very few cases were reported from the southern areas. Legislation for compulsory inoculation is needed.

Trypanosomiasis. In Ngamiland *Glossina mortisans* finds its natural habitat in the 7,000 sq. miles of swamps; the tsetse are gradually encroaching on the grazing areas. This causes overstocking of the available grazing. Trypanocidal drugs are used on a large scale by cattle traders and the Veterinary Department is also treating animals passing through the quarantine stations.

Sheep Scab is a problem mainly of the southern areas. Control is by double dipping of the flocks of each tribal area involved simultaneously in February and March.

Only 817 deaths occurred from Lumpy Skin Disease as compared with 4,092 in 1956.

Botulism and Aphosphorosis are common in large areas of the Protectorate, because the pastures are deficient in phosphorus and some trace mineral elements, even though bone meal is provided and inoculation against botulism is practised.

There was one outbreak of Bluetongue controlled by vaccination. Wild animals killed 7,892 domestic livestock. Animals lost from unknown causes totalled 7,054.

Various vaccines supplied to private owners totalled 90,857 doses. All the vaccines used in the Protectorate are supplied by Onderstepoort.—J. A. Griffiths.

BOOK REVIEWS

Burnet, F. M. (1960). **Principles of animal virology.** pp. ix+490. New York (& London): Academic Press. 2nd edit. $12.00. **3115**

In the second edition of this valuable book Burnet has largely rewritten the text and eliminated one chapter and in so doing has brought up to date the various aspects of virology.

There are twenty chapters, each of which is practically self contained, following a logical sequence of thought rarely found in a text book.

In Chapters I & II Burnet gives an Historical Introduction and General Outline of the Problems which he follows with a chapter on each aspect of the subject. Those chapters on Significance of immunity, Ecological aspects of virus disease, and Variation of animal virus are especially stimulating.

Veterinary virology which itself has made great advances in the last decade now claims more attention than in the first edition; reference is made to most of the virus diseases of veterinary importance. A few minor errors mainly on the veterinary aspects which were pointed out in the review of the 1st edition [*V.B.* **26,** 3046] are still to be found. An error in Fig. 14 makes interpretation difficult.

This book is not only essential for the Medical and Veterinary Virologists but should be read by all interested in either science.

—P. S. Dawson.

Nemeséri, L. & Holló, F. (1961). Állatorvosi parazitológiai diagnosztika. **[Diagnosis of parasitic diseases of domestic animals.]** pp. 320. Budapest: Mezogazdasági Kiadó. 2nd revised edit. [In Hungarian.] **3116**

The first edition of this book has already been reviewed [See *V.B.* **28,** 3463]. This second edition, necessitated by great demand, has appeared in an improved cover. It

includes additional details, including those obtained during the past two years, and numerous illustrations, and has been expanded by some 70 pages. There is an index and a bibliography.

Such a comprehensive and practical, yet sufficiently complete presentation of parasitology to meet the needs of the practitioner, laboratory worker or student, is perhaps unique in the international literature.

—A. Sebesteny.

Anthony, D. J. & Lewis, E. F. (1961). **Diseases of the pig. A handbook of the diseases of the pig with an introduction to its husbandry.** pp. xi+407. London: Baillière, Tindall & Cox. 5th Edit. 35s. **3117**

This new edition does not differ fundamentally from that of 1955 (reviewed in *V.B.* **26,** 1075). The author was joined by E. F. Lewis (since deceased) of the Royal Veterinary College and there has been some re-arrangement, revision and improvement, with the inclusion of new information about diseases such as agalactia, oedema disease, congenital myoclonia and many other conditions. Unfortunately, many errors remain. Thus in the account of rabies the size of the virus is still expressed in milligrams and it is stated that Pasteur's treatment is used in many countries for the *cure* of rabies, It is stated that Teschen disease "may well be a variant of" Aujeszky's disease; the basic differences in aetiology and pathogenesis of the two diseases are not clearly stated. On pages 282, 293 and 307 it is stated that German writers [not specified] ascribe a skin disease to *Spiradenitis coccidiosa.* This appears to refer to the work of Olt (*Arch. wiss. prakt, Tierheilk.* 1896 p. 434) who found a "coccidium" in the skin of pigs with a shotty eruption and who coined the term spiradenitis coccidiosa suis. However, this work does not appear to have been confirmed and it is no longer mentioned in current German textbooks. Spiradenitis means inflammation of sweat glands and is not the generic name of a parasite. The fungus *Coccidioides immitis* has been put with the protozoa under the heading 'coccidiosis' (p. 306). Two minor errors are the mis-spelling as 'Aujesky's disease' of the disease first described by Aládar Aujeszky in Hungary, and the spelling of the name of Karl Glaesser (or Glässer) as Glasser. The number of pages has been increased by 38 and the price by 10s.—R.M.

Anon. (1961). **The Merck Sharp & Dohme International poultry service manual.** pp. ix+173. New York: The Company. 2nd edit. $2.75. **3118**

When consulting this handbook it is important to remember that it is an American publication written primarily for the lay reader, to enable him to establish a "tentative diagnosis of disease", although whether a "do it yourself" publication of this kind is desirable, is a debatable point.

The book is divided into five parts, excluding the index. Part 1, "The Diagnosis of Poultry Diseases", is probably the most useful section, because it describes to the non-veterinarian the type of information that a veterinary surgeon will require in order to make a tentative diagnosis and to decide what immediate action is necessary before a thorough investigation is carried out.

Part 2, "Postmortem Guide and Diagnostic Index", attempts to describe to the layman the diagnostic lesions of all the common poultry diseases in 19 small tabulated pages. In the opinion of the reviewer this can only lead to confusion, although to the non-specialist veterinarian the tables should be of some value.

Part 3, dealing with "Poultry Diseases and Parasites", is a similar attempt to summarize a vast subject. No indication is given concerning the distribution of the various diseases and several diseases are listed which do not occur in Gt. Britain. There is a list of the susceptible species under each disease heading, but in many cases (*e.g.* Trichomoniasis) there is little indication that the symptoms and post-mortem lesions, or the susceptibility of various species may differ considerably. The table of parasites would be improved by giving the scientific names of the parasites. The section on Nutritional Diseases gives some useful information regarding the recommended levels of vitamins in the food, but tends to oversimplify the symptoms of deficiencies, giving the impression that clear cut deficiencies occur. Mineral deficiencies, however, are omitted.

Part 4 deals almost entirely with Merck Poultry Health Products and also includes some useful charts on subjects such as food consumption, feed conversion etc.

Most of the information given in Part 5 on vaccination procedures is inapplicable in countries such as Gt. Britain, where the use of poultry vaccines is restricted and controlled.

The reviewer's first impressions suggested

that the book achieved its object, but on closer study it became obvious that its value was limited, especially outside America.

—I. F. KEYMER.

Lewis, D. [Edited by.] (1961). **Digestive physiology and nutrition of the ruminant. Proceedings of the University of Nottingham Seventh Easter School in Agricultural Science, 1960.** pp. ix+297. London: Butterworths. 50s. 3119

The 23 review articles collected together in this volume are arranged under three headings: physiology of the rumen, metabolism in the rumen, ruminant nutrition and endocrinology. The largest contribution (6 articles) comes from the Rowett Research Institute, followed by the National Institute for Research in Dairying (3 articles), Nottingham University (3 articles) and so on. Most of the contributions are from Gt. Britain, but there are also papers by S. Hyden of Sweden, R. W. Dougherty and J. C. Shaw of the U.S.A., E. Brouwer of the Netherlands, R. L. Reid and D. B. Lindsay of Australia.

Each paper is accompanied by discussions that took place during the conference. There is an index to names of authors cited, and a subject index. This book gives a broad view of physiological, biochemical and nutritional aspects of rumen digestion in healthy cattle, sheep and goats, and of the endocrinology of ruminants. It does not deal with disorders of function or metabolism.—R.M.

Parkes, A. S. [Edited by.] (1960). **Marshall's physiology of reproduction. Volume I, Part 2.** pp. xx+877. London: Longmans, Green & Co. Ltd. 3rd Edit. 240s. 3120

The third edition of Volume I, Part 1 was published in 1956 and the third edition of Volume II in 1952. This second part of Volume I does not complete that volume as originally intended and a third part is to appear in 1961.

Part 2 consists of eight chapters of which the first four are complementary and constitute an advanced text of male, mainly mammalian, physiology suitable for specialist workers. The first chapter by M. W. H. Bishop and the late Arthur Walton deals in 101 pages with spermatogenesis and the structure of spermatozoa, including their physiology within the male tract. There is a short chapter by Walton on "natural insemination"—too short from the point of view of those responsible for A.I. services, but of great interest from the comparative aspect. A. S. Parkes contributes a chapter on the biology of semen outside the male body, with observations on a variety of non-mammals but also covering storage, transport, insemination, and survival in the female of the chief domestic species. Bishop and Walton follow more briefly though sufficiently comprehensively with a severely practical chapter on metabolism and motility, mainly of bull spermatozoa, taking into due account the effects of oxygen and carbon dioxide tensions, extent of dilution, effect of various additives, etc. Walton and C. R. Austin conclude this portion of the book with a long chapter on fertilization including capacitation, work on *in vitro* fertilization, and parthenogenesis. The standard of scholarship is very high, but the criticism may be made that where different authors discuss the same subject there is some overlapping, and there are also some omissions. Thus sperm transport in the cow is dealt with both by Walton and by Parkes, but the reader will find some overlapping, while some interesting controversies, such as that between Vandemark and Dauzier on transport speed, are mentioned rather than discussed, and important contributions such as those by Skjerven, Docke, and Veelken are not included.

Two of the eight contributors, although not veterinary surgeons, are from the Royal Veterinary College.

The last three chapters are of chiefly zoological interest. J. M. Dodd writes in surprising detail on gonadal and gonadotrophic hormones in fish, amphibia and reptiles. The penultimate chapter by Parkes and A. J. Marshall deals with the reproductive hormones in birds, interestingly and at times amusingly. This chapter will be useful to workers concerned with poultry but the text is by no means confined to this species. E. C. Amoroso and the late F. H. A. Marshall's chapter on external factors in periodicity concludes the book. Here some of the material relevant to cattle is out of date or not well digested, the seasonal pattern of calving incidence is based on a paper published as far back as 1928. From the "natural history" point of view, however, much fascinating material has been incorporated. The summary of the evidence on the delayed implantation phenomenon is particularly striking.

—F. L. M. DAWSON.

Villee, C. A. [Edited by.] (1961). **Control of ovulation. Proceedings of the Conference held at Endicott House, Dedham, Massachusetts, 1960.** pp. x+251. Oxford (New York, London & Paris): Pergamon Press. 70s. 3121

There were 33 participants in this conference, of whom 23 represented the practice of medicine and medical education, 5 were zoologists including M. C. Chang and G. Pincus, and 5 were applied workers on agricultural aspects whose names will be more familiar to veterinary readers, S. J. Folley, J. Hammond, Jr., A. V. Nalbandov, W. Hansel and R. M. Fraps.

Twelve papers were presented; most were followed by discussions of which two were outstandingly spirited and well sustained, those following Pincus' and Merrill's paper on the role of steroids in controlling mammalian ovulation, and the papers by Fraps on ovulation in fowl and by Hammond in the ewe and cow. These two papers with a third by Nalbandov comprise the important part of the book from the veterinary point of view, and are workman-like summaries of existing literature. Nalbandov publishes original work on ovulation in the hen leading up to the theory that luteinizing hormone acts by causing ischaemia and hence necrosis of the stigma.

Two of the papers are based on human material, perhaps the more striking being that by Rock which describes very successful results on ovulation suppression with the progestogen 17α ethinyl 5 (10) oestraeneolone together with 1·5% ethynyl oestradiol 3 methyl ether as adjuvant. The remaining 8 papers are mainly on the more academic aspects of ovulation control based largely on the rat and rabbit though with a leavening of results using monkeys. Many original observations with excellent photographs are included, and the general standard of work described is high, but as the papers average 20 pages in length it would have been an improvement if half page summaries had been provided for more of them.—F. L. M. Dawson.

BOOKS RECEIVED

[Notice of recently received books in this list does not preclude review]

Caldeyro-Barcia, R. & Heller, H. [Edited by] (1961). **Oxytocin. Proceedings of an international symposium held in Montevideo, 1959.** pp. xxiv+443. Oxford (London, New York & Paris): Pergamon Press, Symposium Publications Division. 100s.

Cunningham, C. H. (1960). **A laboratory guide in virology.** pp. xii+173. Minneapolis, Minn.: Burgess Publishing Company. 4th Edit. $3.25.

Fraser, A. & Stamp, J. T. (1961). **Sheep husbandry and diseases.** pp. xii+459. London: Crosby Lockwood & Son, Ltd. 4th Edit. 35s.

Lane-Petter, W. (1961). **Provision of laboratory animals for research: a practical guide.** pp. xii+147. Amsterdam (London, New York & Princeton): Elsevier Publishing Company. 20s.

Lerche, M., Bartels, H. & Kelch, F. [Edited by] (1961). A. Schroeter/M. Hellich. Das Fleischbeschaugesetz nebst zusätzlichen Verordnungen und Gesetzen, mit Erläuterungen. Teil III. **[Meat inspection law, with explanations. Part III.]** pp. vii+186. Berlin (& Hamburg): Paul Parey. 7th Edit. DM 22.

Mackenzie, P. Z. & Simpson, R. M. (1961). **The African veterinary handbook.** pp. xi+279. Nairobi: Sir Isaac Pitman & Sons Ltd. 3rd Edit. 25s.

Marshall, A. J. [Edited by] (1960). **Biology and comparative physiology of birds. Volume I.** pp. xii+518. New York (& London): Academic Press. $14.00.

Marshall, A. J. [Edited by] (1961). **Biology and comparative physiology of birds. Volume II.** pp. x+468. New York (& London): Academic Press. $13.00.

Runnels, R. A., Monlux, W. S. & Monlux, A. W. (1960). **Principles of veterinary pathology.** pp. xii+732. Ames, Iowa: The Iowa State University Press. $12.50.

—. (1961). **The scientific basis of medicine. Annual Reviews 1961.** pp. xi+342. University of London: The Athlone Press. 40s. [British Postgraduate Medical Federation.]

Printed in Great Britain by Charles Burrell & Son, Chertsey, Surrey.

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As from January 1962, when the increased subscription rate comes into operation, the *Veterinary Bulletin* will contain review articles of the same type as are now published in *Veterinary Reviews and Annotations* which will then cease publication. The amalgamation of the two journals will not lead to any reduction in the number of abstracts, nor is it the intention to reduce the number of reviews.

CONTENTS

	Page
Diseases caused by Bacteria and Fungi	563
Diseases caused by Protozoan Parasites	575
Diseases caused by Viruses and Rickettsia	577
Immunity	586
Parasites in Relation to Disease [General]	588
Parasites in Relation to Disease [Arthropods]	588
Parasites in Relation to Disease [Helminths]	590
Spontaneous and Transmissible Neoplasms and Leucaemias [Including Fowl Paralysis]	594
Nutritional and Metabolic Disorders	595
Diseases, General	601
Poisons and Poisoning	604
Pharmacology and General Therapeutics	606
Physiology, Anatomy and Biochemistry	607
Reproduction and Reproductive Disorders	611
Zootechny	615
Technique and Apparatus	615
Reports	616
Book Reviews	620

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INDEX TO AUTHORS

de Abreu Martins, I., 3219.
Adawy, A. T., 3428.
Adlan, A. M., 3240.
Adler, J. H., 3326.
Ajello, L., 3200.
Akaike, Y., 3132.
Alberts, J. O., 3140.
Albrecht, P., 3246.
Alexander, T. J. L., 3364.
Allcroft, R., 3384.
Almássy, K., 3225.
Ando, K., 3132.
Annison, E. F., 3332.
Anthony, D. W., 3287.
Arnall, L., 3408.
Arthur, B. W., 3279.
Ashton, G. C., 3436.
Asso, J., 3217.
Atanasiu, P., 3224.
Avery, R. J., 3386.
Ayfantis, S., 3370.
Azuma, R., 3132.

Babicheva, A. J., 3162.
Babudieri, B., 3176.
Bain, R. V. S., 3449.
Baker, B. E., 3274.
Balaci, M., 3189.
Balazs, T., 3194.
Baldaev, S. N., 3354.
Bannister, G. L., 3177, 3258.
Barbiera, A., 3314.
Barnes, C. M., 3404.
Barnet, A. J. G., 3451.
Barros Santos, C., 3331.
Bartley, E. E., 3328.
Bassiouni, A., 3166.
Baumann, J. B., 3270.
Beam, R. E., 3142.
Beamer, P. D., 3140.
Becker, E. L., 3271.
Becker, R. B., 3439.
Beghelli, V., 3409.
Bell, D. S., 3429.
Bell, M. C., 3379.
Belouitic, M., 3360.
Ben David, B., 3143.
Bendixen, H. C., 3342.
Bengelsdorff, H. J., 3230, 3271.
Bernhardt, W., 3345.
Bertok, E. I., 3274.
Bhatnagar, D. S., 3397.
Birnaure, G., 3248.
Black, F. L., 3268.
Blackburn, P. S., 3358.
Blincoe, C., 3389.
Bodenstein, O., 3287.
Bömer, H., 3340.
von Bogaert, L., 3343.
Boldiszár, H., 3356.
Del Bono, G., 3333.
Bontscheff, N., 3255.
Borgatti, G., 3409.
Boulanger, P., 3177.
Boyd, E. M., 3393.
Boyer, F., 3128.
Bran, L., 3248.
Braum, W., 3171.
Broda, E., 3455.
Brody, S., 3431.
Brown, S. R., 3224.
Brumfield, G. L., 3200.
Brunsdon, R. V., 3309.
Buechner, H. K., 3396.
Burducea, O., 3134.
Burnett, G. F., 3284.
Burton, A. N., 3235.
Busch, W., 3167.
Bussolati, C., 3275.
Bustad, L. K., 3404.
Buttiaux, R., 3149.
Buttram, J. R., 3279.
Byrne, J. L., 3141.

Canada, R. O., 3410.
Capps, W. I., 3262.
Carbrey, E. A., 3175.
Carda Aparici, P., 3331.
Carlson, W. D., 3186.
Carlström, G., 3431.
Carnaghan, R. B. A., 3384.
Carp, N., 3248.
Carrère, L., 3245.
Casady, R. B., 3339.
Casarosa, L., 3303, 3315.
Castañeda García, J., 3218.
Castle, M. E., 3358.
Cesari, F., 3199.
Chabassol, C., 3302.
Chaudhary, N. C., 3397.
Cherkasskii, E. S., 3161.
Choquette, L. P. E., 3141.
Christiansen, M. J., 3135.
Christodoulopoulos, A., 3370.
Claborn, H. V., 3291.
Clausen, H., 3363.
Claydon, T. J., 3328.
Clec'h, L., 3260.
Cluff, L. E., 3124, 3125, 3126, 3127.
Collombier, M., 3224.
Comar, C. L., 3374.
Comline, R. S., 3417.
Connell, R., 3235.
Conti, C. R., 3125, 3127.
Cornelius, C. E., 3330.
Corner, A. H., 3258.
Corry, J. R., 3446.
Cortez, A., 3245.
Craplet, M. C., 3151.
Crawford, R. D., 3164.
Csontos, L., 3223.
Cunningham, C. H., 3450.

Damon, R. A., 3339.
Dănescu, A., 3133.
Daniels, J. B., 3234.
Davies, M. E., 3192.
Davis, A. D., 3244.
Davis, G. K., 3344, 3382.
Dawson, F. L. M., 3426.
Dawson, J. B., 3442.
Day, E. J., 3317.
Desai, R. N., 3418.
Deschiens, R., 3290.
Devos, A., 3369.
Dickel, H., 3139.
Dimitrov, G., 3308.
Dinculescu, P., 3227, 3228.
Dineen, J. K., 3273, 3276.
Ditchfield, J., 3194.
Dobson, R. C., 3289.
Donker-Voet, J., 3178, 3193.
van Dorssen, C. A., 3193.
Doty, L. T., 3319.
Dózsa, I., 3159.
Dreizen, J. G., 3336.
Dreizen, S., 3336.
van Drimmelen, G. C., 3170.
Drouhet, E., 3195.
Drury, A. R., 3392.
Drysdale, A. D., 3358.
Dualde Perez, V., 3294.
Dumith Arteaga, G., 3207.
Dungworth, D. L., 3200.
Dunne, H. W., 3250.
Dunsford, I., 3272.

Eckell, O. A., 3329.
Eddy, G. W., 3288.
Egyed, M., 3326.
van der Eijk, W., 3376.
Elwell, L., 3147.
Embrey, M. P., 3390.
Englehard, W. E., 3247.
Ensminger, M. E., 3422.
Eremeev, M. N., 3146.
Ernek, E., 3246.
Estergreen, V. L., Jr., 3416.
Evans, S. A., 3240.
Ewing, S. A., 3312.

Fabian, G., 3423.
Faninger, A., 3377.
Farrington, K. J., 3385.
Favati, V., 3311, 3316.
Favre, S., 3224.
Ferris, D. H., 3140.
Fina, L. R., 3328.
Firehammer, B. D., 3191.
Folkers, C., 3210.
Forrest, G. E., 3222.
Fougereau, M., 3217.
Fowler, R. O., 3322.
Fratta, I., 3123.
French, F. E., 3283.
Frik, J. F., 3193.
Fuentes Marins, R. A., 3218.
Fujimoto, Y., 3425.
Fulford, R. A., 3393.

Gallagher, C. H., 3385.
Gallivan, J. F., 3141.
Gallo, G. G., 3329.
Gallo, P., 3199.
Garren, H. W., 3165.
Gáspár, N. Z., 3356.
Gaud, J., 3296.
Geissler, H., 3166.
George, J. T. A., 3136.
George, L. A., 3404.
Geurden, L. M. G., 3369.
Gheorghiu, I., 3228.
Gierloff, B. C. H., 3197.
Gilmour, D. G., 3272.
van Gils, J. H. J., 3131.
Gimeno, E. J., 3188.
Gitter, M., 3160.
Gołaszewski, H., 3253.
Gollop, J. B., 3235.
Gordon, H. McL., 3307.
Gordon, I., 3440.
Goshi, K., 3124, 3125, 3126.
Goube de Laforest, P., 3325.
Graber, M., 3297.
Grăsoiu, G., 3133, 3134.
Gray, W. J., 3292.
Greenwood, D. A., 3379.
Gregory, B. R., 3335.
Greig, A. S., 3258.
Grešiková, M., 3246.
De Gresti, A., 3406.
Grice, H. C., 3194.
Grigoriu, N., 3189.
Griminger, P., 3341.
Griner, L. A., 3185, 3186, 3187.
de Groot, B., 3421.
Gruber, R., 3129.
Guilhon, J., 3297.
Guillo, B., 3211.
van der Gulden, W. J. I., 3210.
Gusev, B. A., 3162.

Hackett, P. L., 3404.
Häggroth, S., 3372.
Hafez, E. S. E., 3422.
Hahn, P., 3400.
Hajdú, S., 3169.
Halaša, M., 3184.
Halpin, B., 3381.
Hanly, S., 3437.
Hardwick, B. C., 3351.
Hardwick, D. C., 3403.
Hartwigk, H., 3230.
Hart, P. C., 3353.
Harthoorn, A. M., 3396.
Hashimoto, H., 3423.
Haugg, G., 3129.
Hay, C., 3328.
Hayden, A. R., 3271.
Heath, K. R., 3183.
Heaton, F. W., 3442.
Héjj, L., 3223.
L'Héritier, M., 3195.
Herrick, J. B., 3261.
Hiepe T., 3362.
Hill, C. H., 3165.
Hill, J. E., 3317.
Hill, J. K., 3361.
Hill, J. R., 3399.
Hobohm, K. O., 3220, 3221.
Höglund, G., 3372.
Hoorens, J., 3254, 3365.
Hooven, N. W., 3287.
Horton, A. M., 3317.
Howell, P. G., 3239.
Hovte, H. M. D., 3205.
Huber, D. A., 3289.
Huddleson, I. F., 3173.
Hurwitz, S., 3341.
Hutchison, J. A., 3194.
Hutt, F. B., 3164.

Ide, Y., 3163.
Ishikawa, T., 3425.
Isopescu, I., 3133, 3134.
Ivanov, G. V., 3354.
Ivey, M. C., 3291.

Jacob, K., 3172.
Jacobs, L., 3212.
Janowski, H., 3253.
Jeacock, M. K., 3355.
Jellison, W. L., 3195.
Johnson, J. E., Jr., 3124, 3125, 3126.
Jull, D. J., 3183.

Kabuto, M., 3155.
Kaigorodov, P. I., 3182.
Kajiwara, N., 3155.
Kanagawa, H., 3424, 3425.
Kao, T. T-H., 3388.
Karib, A. E., 3204.
Kataoka, T., 3229.
Kato, K., 3229, 3232.
Kautter, D. A., 3147.
Kawata, K., 3425.
Kemény, A., 3356.
Kessel, R. W. I., 3171.
Khan, M. A., 3386.
Kilbourne, E. D., 3233.
Kleinschroth, E., 3129.
Klimeš, B., 3280.
Knocke, K.-W., 3242.
Knudsen, O., 3427.
Kokanović, R., 3179.
Koldovský, O., 3400.
Kral, F., 3198.
Kramer, T., 3386.
Krčméry, V., 3184.
Kronberger, H., 3320.
Kronfeld, D. S., 3357.
Krüger, W., 3167.
Kuba, N., 3300.
Kubica, G. P., 3142.
Kucsera, G., 3144.
Kushnir, M. M., 3182.
Kutas, F., 3407.
Kuttler, K. L., 3389.

Ladell, W. S. S., 3387.
Ladzianska, K., 3184.
Lafenètre, H., 3245.
Lafortune, J.-G., 3391.
Lagacé, A., 3250.
Laing, J. A., 3190.
Lambelin, G., 3293.
Lamensans, A., 3128.
Lapage, G., 3278.
Lazarov, E., 3308.
Lecce, J. G., 3337, 3338.
Leclerc, J., 3216.
Leech, F. B., 3359.
Lenets, I. A., 3354.
Leroux, C., 3398.
Lever, J. D., 3355.
Liebermann, H., 3180.
Liess, B., 3242.
Linzell, J. L., 3403.
Litvinov, N. A., 3202.
Lock, J. A., 3396.
Lodge, T., 3272.
Lovelace, S. A., 3191.
Ludvigsen, J., 3366.
Luginbuhl, R. E., 3268.

van Maanen, P. H. A. M., 3193.
Maas, H. J. L., 3371.
McCall, J. T., 3344.
McClure, T. J., 3435.
MacDermid, M., 3272.
McDonald, I., 3122.
McDonald, M. F., 3430.
Mackenzie, P. Z., 3453.
McLaughlin, R. F., 3410.
Maldonado Hernández, A., 3218.
Mandin, J., 3245.
Mann, H. D., 3291.
Mann, P. H., 3123.
Manso Ribeiro, J., 3251.
Mantovani, A., 3259.
Marble, D. W., 3389.
Marrenghi, O., 3316, 3333.
Martin, A. A., 3229.
Mason, R. S., 3205.
Matrone, G., 3337, 3338.
Matthews, P. R. J., 3152.
Matveev, V. A., 3354.
Mavaudon T. H., 3310.
Mayneord, W. V., 3373.
Mayr, A., 3265.

Meijer, W. C. P., 3376.
Mel'nikova, A. D., 3215.
Melton, M. L., 3212.
Merino, E. E., 3199.
Merriman, G. M., 3379.
Du Mesnil Du Buisson, F., 3413.
Michel, M. C., 3203.
Mihăiță, S., 3249.
Miller, A. W. D., 3284.
Miller, B. S., 3154.
Millian, S. J., 3247.
Mitchell, D., 3177, 3258.
Mitchison, N. A., 3277.
Möse, J. R., 3323.
Moulton, J. E., 3330.
Moll, T., 3244.
Monroe, R. A., 3374.
Montagne, P., 3302.
Morgan, D. O., 3337.
Moro S. M., 3138, 3168.
Müller, M., 3180.
Musche, R., 3380.
Muth, O. H., 3349.

Nassal, J., 3137, 3452.
Neil, M. W., 3414.
Nelson, W. A., 3205.
Neuman, F., 3326.
Neundorf, R., 3345.
Niederländer, R., 3214.
Ninomiya, W., 3155.
Nitoiu, I., 3228.
Nobel, T. A., 3326.
Nobuto, K., 3237.
Norris, K. R., 3281.

O'Dell, B. L., 3351.
O'Kelly, J., 3384.
Oldfield, J. E., 3349.
Orstadius, K., 3352.
Ostby, P. C., 3335.
Owen, L. N., 3394.

Packer, R. A., 3175.
Page, L. A., 3150.
Palacios García, C. A., 3218.
Palsson, P. A., 3343.
Papadopoulos, A., 3370.
Paraf, A., 3217.
Parmeggiani, P. L., 3409.
Partington, H., 3348.
Pascu, L., 3189.
Pattison, F. L. M., 3378.
Pattison, I. H., 3152.
Patyra, W., 3206.
Pavlov, P., 3308.
Payne, D. J. H., 3136.
Pejkovski, J., 3179.
Pellegrini, N., 3415.
Pellegrini, S., 3415
Perry, B. T., 3273, 3276.
Peterson, W. D., Jr., 3257.
Petrovszky, M., 3189.
Petter, F., 3195.
Piccolino, G., 3259.
Pickering, D. E., 3388.
Piekarski, G., 3214.
Pierotti, P., 3301.
Piette, J.-M., 3302.
Pilipavicius, J., 3141.
Pistey, W. R., 3395.
Planes de Banchero, E., 3220.
Pobisch, A., 3367.
Podgurniak, Z., 3324.
Poirier, M., 3299.
Pokorná, J., 3256.
Pokorny, B. A., 3233.
Polishchuk, F. G., 3298.
Pols, J. W., 3282.
Popa, M., 3249.
Portela, R. A., 3329.
Pourquier, M., 3245.
Prange, H., 3139.
Preibisch, J., 3432.
Price, S. M., 3403.
Pridham, T. J., 3261.
Pritchard, W. R., 3439.
Provost, A., 3201.

Quatrefages, H., 3245.
Quintero, G. L. A., 3286.
Quiroz Vega, C. A., 3263.

Radley, J. M., 3373.
Radostits, O. M., 3241.
Rahlmann, D. F., 3411.
Ratner, J. J., 3234.
Rauch, H., 3345.
Raun, E. S., 3283.
Reed, C. M., 3327.
Reid, R. L., 3451.
Remington, J. S., 3212.
Rempel, J. G., 3235.
Restani, R., 3259.
Reynolds, G., 3351.
Rheault, J. P. E., 3391.
Rice, C. E., 3236.
Richter, O., 3129.
Rislakki, V., 3243.
Rivenson, S., 3220, 3221.
Roberts, H. F., 3382.
Roberts, R. H., 3291.
Robertson, I. S., 3401.
Rodriquez, C. C., 3199.
Roe, C. K., 3364.
Rogers, K. B., 3153.
Romboli, B., 3301, 3303, 3333.
Rosa Azevedo, J., 3251.
Roshdy, M. A., 3269.
Ross, D. B., 3347.
Roth, A. R., 3288.
Rothe, K., 3420.
Rowe, W. P., 3262.
Rüsse, I., 3402.
Ruiz Castañeda, M., 3174.
Rusu, V., 3248.

Sabec, D., 3368.
Sanger, V. L., 3429.
Sano, K., 3313.
Santi, A., 3275.
Sargeant, K., 3384.
Sasaki, N., 3313.
Sasaki, S., 3155.
Savan, M., 3241.
van der Schaaf, A., 3193.
Schäfer, E., 3214.
Schiavo, A., 3266.
Schilling, E., 3368.
Schmittdiel, E., 3267.
Schöberl, A., 3380.
Schubert, J. R., 3349.
Schulz, L. C., 3368.
Sciarra, D., 3259.
Sebek, Z., 3181.
Segretain, G., 3195.
Sellwood, E. H. B., 3348.
Shimizu, K., 3213.
Shokeir, A. A., 3428.
Shortridge, E. G., 3304.
Silver, M., 3417.
Silverman, S. J., 3147.
De Simon, M., 3248.
Simpson, R. M., 3453.
Skoda, R., 3256.
Smart, K. M., 3233.
Smith, A. N., 3177.
Smith, H. A., 3222.
Snyder, W. W., 3392.
Sojka, W. J., 3160.
Sorina, S. E., 3161.
Soulsby, E. J. L., 3306.
Spais, A., 3343.
van Sprockhoff, H., 3264.
Stampa, S., 3282.
Stanca, M., 3228.
Stenberg, H., 3158.
Stepanenko, N. D., 3146.
Stojev, P., 3308.
Stone, R. E., 3336.
Strachan, N. H., 3358.
Ström, B., 3434.
Studdert, M. J., 3241.
Stützel, M., 3356.
Suitor, A. E., 3339.
Summerville, W. A. T., 3445.
Szabó, I., 3223.
Szabó Szücs, J., 3225, 3226.
Szurman, J., 3252.

Taglia, L., 3259.
Takanami, M., 3163.
Tatarov, B., 3308.
Taylor, E. L., 3305.
Taylor, J., 3153.
Temper, K., 3145.
Thafvelin, B., 3334.
Thiin, J. W., 3447.
Thomas, J. A., 3216.
Thomsen, R. N., 3363.
Thoonen, J., 3254, 3365.
Todd, A. C., 3312.
Tokarnia, C. H., 3321.
Tomar, N. S., 3418.
Trainer, D., 3140.
Trbić, B., 3179.
Tsubahara, H., 3229, 3232.
Turner, R. C., 3373.
Turudić, V., 3179.
Tyler, W. S., 3410.

Ueda, S., 3155.
Uhr, J. W., 3270.
Underbjerg, G. K. L., 3383.
Ursache, R., 3227.
Uscavage, J. P., 3198.
Uziębło, B., 3156.

Vacek, Z., 3400.
VanDemark, N. L., 3416.
Vandeplassche, M., 3438.
Velle, W., 3427.
Venkataswami, V., 3419.
Verge, J., 3217.
Véron, M., 3148.
Villemot, J.-M., 320.
Vollhardt, Y., 3245.
Voûte, E. J., 3371.
Vuković, V., 3130.

Walker, D. G., 3414.
Walker, W. W., 3200.
Wallace, J. C., 3412.
van der Walt, K., 3208.
Warren, F. L., 3414.
Wasserman, R. H., 3374.
Watanabe, S., 3238.
Weaver, E., 3392.
Weil, M. H., 3154.
Wejda, E., 3285.
Westphal, W., 3139.
White, F., 3122.
White, I. G., 3412.
White, P. J., 3284.
White, R. R., 3332.
Whitten, L. K., 3304.
Wilcox, C. J., 3439.
Wilder, O. H. M., 3335.
Wilkinson, P. R., 3281.
Williams, G., 3440.
Wilson, T., 3318.
van der Wouden, M., 3209.
Wright, J. F., 3395.

Yadava, I. S., 3328.
Yarborough, J. H., 3319.
Yeo, D., 3284.
Young, F. G., 3355.

Zaĭtsev, A. G., 3182.
Zakiewicz, M., 3443.
Zuffa, A., 3256.

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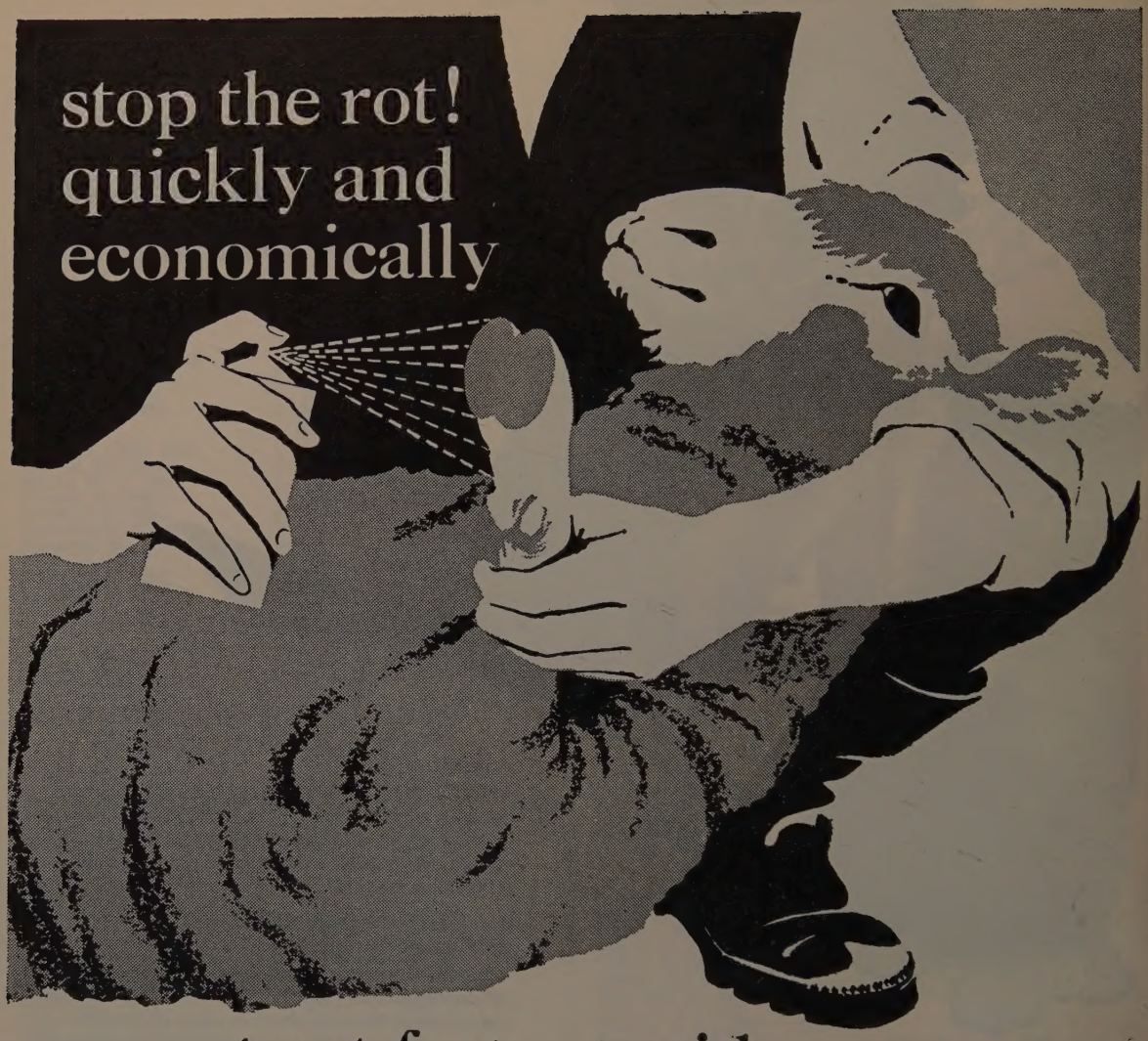

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